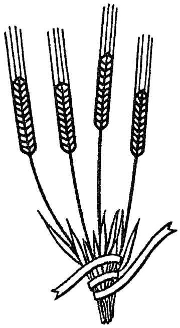
EDITED BY THEODORE W. SCHULTZ

FOOD
FOR THE WORLD



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THE
NORMAN WAIT HARRIS MEMORIAL FOUNDATION

The Twentieth Institute

CARL F. HUTH · *DIRECTOR*

THE Harris Foundation Lectures at the University of Chicago have been made possible through the generosity of the heirs of Norman Wait Harris and Emma Gale Harris, who donated to the University a fund to be known as "The Norman Wait Harris Memorial Foundation" on January 27, 1923. The letter of gift contains the following statement:

> *The purpose of the foundation shall be the promotion of a better understanding on the part of American citizens of the other peoples of the world, thus establishing a basis for improved international relations and a more enlightened world-order. The aim shall always be to give accurate information, not to propagate opinion.*

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PUBLISHED 1945. THIRD IMPRESSION JANUARY 1946. COMPOSED AND
PRINTED BY THE UNIVERSITY OF CHICAGO PRESS, CHICAGO, ILLINOIS, U.S.A.

INTRODUCTION

AMONG the professional workers concerned with food for the world an array of unsettled issues affecting international relations has arisen, as is evident from our experience with food for relief and from the proposed United Nations Organization for Food and Agriculture growing out of the Hot Springs conference in 1943. Certainly, these issues have not been bounded by local or national lines: the state of nutrition, the growth of population, and the distribution of food supplies are matters which have become world-wide in scope. Food for relief is but one small facet; relief activities, however, have served to focus attention upon the many important international implications of the food problem.

No single hypothesis is sufficient in probing the role of food in world affairs. The interplay between food and population is not nearly so simple as the older economists, for instance, were prone to believe. The Malthusian thesis is certainly far from adequate in interpreting modern developments. In many countries the supply of food has grown much more rapidly than the demand for food. We know all too well from our pre-war experiences that food can become abundant and cheap, sufficiently so as to bring about a chronically depressed agriculture. Advances in farm technology have altered greatly the supposed "niggardliness of Nature."

The rate at which new farm practices and techniques have been introduced has varied from country to country and from one farming area to another. Populations also have differed greatly in their rates of growth (or decline). Nor have the two necessarily gone hand in hand, for in some countries in which the population has been growing slowly or even declining, the technical revolution in agriculture has brought forth a very substantial increase in food supplies; while in other countries, where the pressure of population has followed closely the pattern laid down by Malthus, agriculture has remained primitive and stagnant.

A few basic questions will make apparent the extent to which we must go in investigating the effects of the growth of population and of food. Will the demand for food stay abreast of agricultural production in a country like the United States? In this question the attention is focused upon a population which is increasing slowly and a country in which technological advances in farming are on the rise. The excess supply of resources in agriculture is large. It consists chiefly of labor, in spite of the fact that the proportion of the nation's working population engaged in farming has dropped from 37 to 15 per cent since 1900.

Can Russia produce food enough to satisfy a rapidly growing population and a rising standard of living? Let us suppose that the population of Russia reaches 250 million in the next twenty-five years, as projected, and that at the same time the demand for food per capita rises fully one-fourth. Under such circumstances the nation would require about 80 per cent more food. Are the resources of Russia capable of producing that much more food with the application of modern agricultural technology?

India and China present another type of problem. Is it possible for countries with high birth and high death rates and a primitive agriculture to increase food supplies enough to improve the diets of the people? Or is the potential growth of the population so high that better diets from any prospective improvements in farming are still very remote?

Dr. Frank W. Notestein, in his penetrating study appearing in this book, has prepared the ground for a re-examination of the food problem in the light of what is now known about the growth of population. His three population types—*incipient decline* (the United States would be an example), *transitional growth* (Russia is an example), and *high growth potential* (India is of this type) give new meaning to our knowledge regarding various populations. These types are much-needed building blocks for social analysis; for the economist in reconsidering the contributions of international trade, for example; and for the nutritionists in better understanding the limitations which food supplies place upon the potential progress that may be made in improving the diets of people in various populations.

In comparatively recent years another field of knowledge has been developed—the fruit of a whole cluster of sciences. This field is nutrition, an important, dynamic force affecting ideas and behavior regarding food. This new knowledge is altering people's food habits and tastes, on the one hand, and changing the efficiency and values of various kinds of food, on the other.

There is a growing realization of the important role that nutritious food plays in health and in the social efficiency of people. Nutrition has made us aware that even in countries with an abundance of food and with high levels of consumption—for example, Australia, Canada, and the United States—many people, for one reason or another, do not have adequate diets.

These newcomers, our students of nutrition, have not restricted their activities to the classroom and to laboratory work. They have recognized the importance of a popular understanding of their findings. As their ideas have been disseminated, new contributions have been sought all the more eagerly; and leaders in this field have been invited to sit at the council tables at which public policies are formulated. The principal policy question which they have helped shape is this: "Why not use the knowledge that nutrition provides and the apparent excess food-producing capacity to provide more adequate diets?"

In this country the Department of Agriculture, with its renowned scientific staff and its far-flung educational facilities, has turned to nutrition in the belief that better diets would contribute not only to the general welfare but also to the solution of the agricultural-surplus problem. Thus the farm problem has become linked in the minds of many people with efforts to attain the goals of better nutrition.

There have been signs of a vigorous "food movement" in several countries supported by a coalition of public servants, students of nutrition and health, certain consumer groups, and some leaders of agriculture.

The Mixed Committee of the League of Nations has done yeoman service in directing attention to the relation of nutrition to health, agriculture, and economic policy. Dr. Frank G. Boudreau, chairman of the Food and Nutrition Board, out of his rich professional experience in work for the League of Nations, has prepared an essay for this book, interpreting the approach used in the Mixed Committee and its significance to national and international effort in behalf of nutrition.

These activities are all parts of the important chapter that workers in nutrition were writing during the interwar years. Their work, of course, was abruptly stopped by the war—a war which has disrupted the lives of millions of people and of most nations with its catastrophic events. Nevertheless, the mobilization of this new field has become even more significant as a consequence of the emergencies in food that have arisen because of the war.

The war has torn asunder the already badly tattered world economy. As the war progressed, less and less trade has been permitted to move through established channels; instead, it has been employed as an instrument in economic warfare. Food has also been made a weapon, forged to win the war and write the peace.

People who were dependent upon trade for a part of their food have been sorely tried. Although most of the food of most of the people of the world is indigenous to the community in which it is consumed, world trade has been vital in providing enough food to many a community in trading countries.

The waging of war also has devastated thousands of fields and farms, a loss which has been in addition to the disruption of trade. Thus many people have not been spared from hunger; we know that tens of thousands have starved, and the blight of malnutrition has seriously affected the health of millions. The war has confronted large populations with a food crisis. This shock and its aftermath will probably leave a deep scar upon both the minds and the bodies of many people. It might be expected that those who have thus suffered will be gravely apprehensive of becoming dependent, once more, upon imported food and upon trade for their very staff of life when alternative measures, although more costly, are at hand to avoid such a dependency. Such an attitude bodes ill for the development of a healthy postwar trade. The undernourishment will also exact its toll in poor health; it may well lower appreciably the social efficiency of many people for years to come.

Along with its legacy of starved bodies and warped minds, however, the war has disciplined people and governments in matters pertaining to food. It has taught some nations how to distribute food more equitably. For the most part the food economy has been managed better than is usually the case during peacetime. The diets of important segments of the population have actually been improved by the public management of our food supplies. Strenuous efforts have been put forth to expand the production of food, and in the process much of the available new knowledge regarding better farm practices and techniques has been put to good account. Likewise, on the side of consumption, the advice of nutritionists has been sought and applied. Several countries—the United States among them—will emerge from the war with a level of consumption that is higher and with diets that are better than those which prevailed prior to the war.

How much of this experience will be lost when peace comes? Will the contributions of nutrition be forgotten? Will various countries again attempt to bring relief to agriculture, as the supplies of farm products become large, by curtailing production? Or will trade and agricultural production be shaped to bring about a better world economy?

As the war recedes, plans for the peace unfold. It is already apparent from the relief efforts of the United Nations that food will play a decisive part. The proposed United Nations Food and Agriculture Constitution is a strong bid for new international machinery to promote orderly progress in food and agriculture on a world scale.

It was against this background that the essays of this book and the Norman Wait Harris Foundation program for 1944 took shape.[1] The ideas and analyses necessary to understand the role of food in world affairs must be drawn primarily from four important groups of professional workers—namely, students of population, nutrition, food supplies, and international relations. Food in its international setting is indeed a barren subject unless one takes cognizance of the contributions of those who are engaged in agricultural economics, nutrition, and the study of population. They stand ready to enrich the field of international relations substantially.

There is, however, considerable divergency of views among the professional workers, which is only natural, for each group has developed the main core of that field of knowledge somewhat in isolation from the others. The differences in judgment have become most marked when the question of appropriate public policy is under consideration.

Leaders in the field of nutrition have been critical of students of the social sciences, particularly of economists, in matters pertaining to food policy. The goal that nutritionists have been seeking to attain is essentially single-purposed. The nutritionists, accordingly, would move more directly and more rapidly toward an adequate diet than do economists, who approach the problem in terms of cost and utility patterns—often, however, giving too much weight to the heavy hand of history.

In planning the Norman Wait Harris Foundation program, the main focus throughout was upon food policy—the fundamental elements appropriate to a food policy in a world setting. With this aim in mind, our task has been to examine the basis for these divergencies, to evaluate their respective merits, and to discover whether or not they can be reconciled and made a part of a larger, consistent policy pertaining to food.

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[1] The Twentieth Institute of the Norman Wait Harris Foundation was held at the University of Chicago, September 4–8, 1944. The general theme of the program was "Food in International Relations."

Other marked differences of view have prevailed. Some of these have been caused by misunderstandings. For example, the work of students of population has not received the attention it has deserved in the formulation of a food policy. In part this neglect has arisen from the fact that in some circles they are viewed as Malthusians and in others as believing that depopulation is inevitable in modern, urban-industrial society. It should be patent that an understanding of the projected rates of growth of populations and of the basic causes determining such growth is both elementary and fundamental.

When we turn to the question of the nature of food supplies and the outlook for the postwar period, a wide difference in judgment has prevailed. There are many who anticipate that most Western countries will again experience chronic surpluses of food. The capacity of our agriculture to produce food is much larger than is commonly supposed. With agricultural surpluses again in prospect, what is an appropriate policy? There are those who would turn to "production adjustments," measures to curtail the output of agriculture, while others view measures to improve the levels of food consumption as a more desirable alternative. Here again: What are the basic facts and what are the necessary conditions for evaluating these widely differing views?

Another set of divergencies relates to international trade. There are those who find themselves supporting policies that lead to particular approaches—for example, to the use of commodity agreements. Others have held that general approaches are much superior, namely, an automatic monetary mechanism and essentially free international trade. These are significant differences in views. What are the relative merits and shortcomings of these alternatives when applied to food and international trade after the war? Which is right and which is wrong when tested by economic criteria, or on political and other grounds?

Here we have, in fine, the main task that was foremost in the minds of those who planned the Twentieth Institute of the Harris Foundation. Each essay was conceived as an integral and necessary part of bringing together the contributions of research in nutrition, agricultural economics, population, and international relations. Fortunately, the leading authorities in each of the four fields were willing to give their time and energy to preparing a series of major essays to focus the issues and thus lay the basis for a new synthesis. Each essay was then presented to a mixed panel of participants, whose observations have been made a part of this study.

These essays quite naturally fall into several distinct groups. The first group provides essential background, by reviewing the international food movement and by drawing lessons from the pre-war and the war period with regard to the distribution of food. The second group of essays entails a consideration of both the quantitative and the qualitative features of a population, as these are related to food.

Nutrition, of course, affords a major point of focus. The essays in this group relate to the progress made in research and its application to consumption, health, and welfare. The validity of the recommended food allowances of the Food and Nutrition Board are presented, and the critical observations made by the participants are also a part of this record. Throughout, constantly in the forefront is the question: What contribution does the knowledge which we now have with regard to nutrition make to food policy?

Still another primary focus comes in a consideration of food supplies. These essays are foreward-looking, that is, concerned about the probable nature of food supplies after the war when demands for relief have been met. The supply outlook is examined with regard to both the more and also the less nutritive foods and cost of production and in relation to food goals aimed at better nutrition. The prospect of food surpluses in the postwar years and their implication with regard to better nutrition and food policy is the keystone to this group.

Finally, there is a direct focus upon international relations with the main emphasis on the respective merits and limitations of alternative international arrangements. Commodity agreements are examined critically. The importance of developing an international expert personnel in government to deal with food and agricultural problems is emphasized in reviewing the progress that has been made by the Interim Commission established by the Hot Springs conference in the proposed constitution for a United Nations Food and Agriculture Organization.

With the contributions at hand with regard to population, nutrition, food supplies, and international relations, two kinds of synthesis have been attempted: one in the discussions of the panel of participants and the other in a final group of essays focusing upon food policy in a developing world economy.

THEODORE W. SCHULTZ

UNIVERSITY OF CHICAGO
January 1, 1945

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PART I

THE FOOD MOVEMENT

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THE INTERNATIONAL FOOD MOVEMENT IN RETROSPECT

By FRANK G. BOUDREAU[1]

THE food resources of the United Nations are now pooled to the end that workers, armed forces, and civilians may be able to play their parts effectively in the war against the Axis. Food ministries or national food administrations have been set up in the belligerent countries to apply as fully as possible the principles of food management, which means, broadly, making the best use of actual and potential food resources. A Combined Food Board has been created to co-ordinate national food policies. The United Nations are preparing to feed the Axis victims when they have liberated the occupied countries, by means of an international organization unique in history. Finally, the determination of the United Nations to establish a new world order based on freedom, justice, and the advancement of human welfare has found its first expression in steps leading to the establishment of an international organization for food and agriculture, whose purpose it will be to assist governments to increase the food resources and improve the diets of all peoples until the aim of freedom from want of food suitable and adequate for health and strength has been achieved throughout the world.

Any one of these events would have been remarkable at any time. At this particular stage in world history they furnish in combination astonishing evidence of the vitality, momentum, and scope which have been attained by the international food movement.

A century of progress in nutrition and public health began slowly in the latter half of the eighteenth century and has gained increasing momentum with the years. It was expressed in Western countries in the steady increase of populations due to reduction in the death rates. At the same time general health and physique improved, and there was an undoubted increase in human stature. Rapid advances in scientific knowledge were applied to industry, agriculture, and transportation so that national income began to rise, and there was gradual improvement in housing, nutrition, education, and other social factors. The application of science and invention to the production and distribution of food increased and steadied the flow of supplies, while scientific advances in medicine brought pestilence under control and led to better sanitation.

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[1] Executive director, Milbank Memorial Fund, and chairman, Food and Nutrition Board, National Research Council.

Arguing along these lines, one could trace the origins of the food movement to the industrial and agricultural revolutions or more remote events. But here I shall emphasize, instead, the international aspects of the food movement which have found their latest expression in the remarkable developments mentioned above: pooling of food resources for victory, war food administrations, combined food boards, and the United Nations organizations for relief and for food and agriculture. My purpose will be served by going no further back than the early 1930's when the League of Nations took the first steps along a road which might in more favorable circumstances have led on to rising standards of living in a peaceful world.

THE LEAGUE OF NATIONS AND THE FOOD MOVEMENT

The international food movement was begun just too late to save the League from the pit which had been dug for it by the weakness or perversity of governments bound by solemn agreements to carry out the provisions of the Covenant. To those who took part in the movement and who saw the effects of this life-giving transfusion on a frustrated council, aimless committees, and an exhausted secretariat, it does not seem farfetched to assume than an earlier start along this road might have had far-reaching effects on the survival of international institutions. Now it is necessary to build anew these institutions from the very foundations, and we shall be more than human if in this rebuilding we fail to repeat at least some of the mistakes of the past. The most we can hope for is that a new league of nations will arise on the ruins of the old, a league very much like the old, but perhaps reinforced in those parts of its structure which have shown obvious weaknesses. The creation of several new functional organizations is a distinct advantage, providing their relationship to the general organization and to each other preserves the proper balance between the autonomy needed for growth and effective action and the co-ordination required to maintain some kind of proportion in the over-all international organization. Individuals die, but they beget sons and daughters so that the race persists. These new functional organizations may be regarded as children of the League of Nations, for they had their beginning in technical League organization and in early life they were molded in structure and form by League experience.

The birth of children is said to bring together married couples whose paths might otherwise diverge. Looking back, one is struck by the fact that before the League took up the food movement, its technical organs functioned independently of each other and consequently lacked effectiveness. This was natural in the case of the International Labour Organization and the International Institute of Agriculture at Rome. But it was also true, in lesser degree, of the technical sections of the secretariat, each of which functioned as separately and independently as if the others did not exist. When the international food movement began to gain momentum, these sections slowly moved into line until they formed a common front; for in the field of food and nutrition each had a distinct but related part to play, and they began to behave, not as individual players, but as members of a team.

Thus the international food movement brought two great benefits to international life. It gave more positive purpose and new hope to international institutions which had been animated hitherto mainly by negative aims. It was not enough to have in view the prevention of epidemics, the removal of obstacles to the flow of international trade—even the prevention of war was not a sufficient objective. The new purpose which the food movement brought to international life responded to the greatest need in the public opinion of the day: the need to raise the standard of living of the masses which were suffering so much in the great depression. And by its integrating force it enabled these international institutions, at long last, to utilize on a common front for a common purpose the weapons which science was providing so abundantly for the conquest of nature.

The movement for better food and nutrition as the most direct and effective means of promoting the public health and welfare and raising the general standard of living came at a time when the League and other international agencies were in the doldrums, for the international honeymoon was over, the tasks arising out of the war had either been accomplished or had proved to be too difficult for the young agency to tackle. The world-wide economic depression was beginning to exert its worst effects and there was hopeless unemployment, hunger, and distress in wide areas. The governments, acting together in the Council and Assembly, or in groups outside of the League, were revealing fatal weakness and indecision in dealing with sparks which promised to grow into the flames of war. I remember well the high spirit of hope which prevailed among the members of the secretariat and the visitors at the Council meetings when the famous debate on the Manchurian invasion was taking place. This gave way to frustration when the Council and the Assembly, which might have stood for practically unanimous world opinion, failed to halt the aggressor.

FEAR AND FRUSTRATION

There was frustration in the economic as well as the political sphere. In spite of numerous and strong recommendations of League committees of experts, there was rapid growth in economic nationalism and hence in the obstacles to international trade and commerce which soon became a mere trickle. Tariff barriers, import quotas, exchange restrictions, and many other like methods were freely utilized in the vain hope that by these means nations would avoid being caught in the downward economic spiral. For a while there was hope that the World Economic Conference might bring at least some relief; but, when that conference broke up without tangible results, governments began to retreat more and more behind their frontiers, seeking relief in the kind of isolation sought by the ostrich which buries its head in the sand.

The spirit of revolution which governments imagined must exist in the miserable masses of unemployed caused them to seize more and more power, so that government by decree with less and less parliamentary sanction became the practice among even traditionally democratic peoples.

It was in this atmosphere of frustration, fear, and futility that the international food movement first experienced any major development. Curiously enough, the last meeting of any League committee in Germany took the first step in this movement. This was a meeting of experts called together by the Health Organization of the League of Nations to advise on methods of appraising the damage to health resulting from unemployment and its consequences. It was held in Berlin in December, 1932, and its recommendations were carried out in health and dietary surveys of the unemployed in a number of countries, including France, Germany, the Netherlands, and the United States of America. It is not necessary to describe this and other technical work of the League leading to the great outburst of activity in food and nutrition in 1935 and subsequent years; suffice it to say that the work of the Health Organization, particularly as it bore on the relation of food to health, seems to have exerted a profound influence on some members of the Council and Assembly who had attempted vainly to cope with the crisis by more traditional methods.

One of the features of the depression which particularly favored the development of the international food movement was the widespread existence and growth of food surpluses. Governments in their despair had tried every possible, and some impossible, methods of dealing with them; buying them up to keep prices from crashing, burning or destroying them by other means, and dumping them abroad. None of these methods was permanently successful, and all were costly. The misery of the unemployed and increasing knowledge concerning the direct relationship of food to health finally brought about a more humane solution, of which the food-stamp plan in this country is a good example.

Actuated by the forces just described, diplomats and statesmen as well as economists and scientists turned their attention to the possibility that standards of living might be raised and human welfare benefited, while at the same time economic order might be restored, if concerted efforts were made to improve the diets and health of the lower-income classes.

THE FORMATION OF THE MIXED COMMITTEE

These ideas spread like fire through the minds of delegates to the League and the International Labour Organization. Sessions of the Assembly, which in former years had been devoted to the major political problems of the day, were spent in eloquent discussions of health, nutrition, and food. The aid of the technical organizations was enlisted, and reports on the varying aspects of food, nutrition, and health began to flow from League presses. Finally, the fact that the subject had many important and varied aspects was impressed upon the international policy-makers, and the integrated attack upon the problem already mentioned began to take form. This led to the formation of what is known commonly as the Mixed Committee, the members of which represented not only the different international organizations concerned but also the health, agricultural, social, and economic aspects of the problem. The final report of that committee well deserved the praise of the *New York Times*, which in a leading editorial referred to it as the book which should have been the book of the year, for it has had deep and far-reaching repercussions and remains today, seven years after its first appearance, the solid foundation and outstanding volume on the international food movement. As this report epitomizes the work of the League and the associated international organizations in this field, the remainder of this article is devoted to its chief recommendations.

Let me first mention the Mixed Committee's description of the international food movement. A chapter of the report is devoted to a century of progress in nutrition and public health in which it is shown that spectacular progress had already been achieved. But, as the report puts it, "the movement towards better nutrition in the past has been largely the result of the unconscious and instinctive groping of men for a better and more abundant life. What is now required is the conscious direction of the natural tendency towards better nutrition. Such direction constitutes policy."[2]

Again the report states: "For nutrition policy to be effective, the problem must be recognized as one of primary national importance. During the past half century, standards of sanitation and housing have undergone remarkable changes in certain parts of the world; conditions which are today regarded as intolerable were fifty years ago considered normal. . . . . The present generation is effecting a similar change in its standards of nutrition. But the importance and future benefits of these new standards of nutrition to health and general well being are not yet sufficiently widely recognized. It lies with Governments, supported by enlightened public opinion, to take the lead. There is no country in which conditions could not be improved with more Government help and direction; . . . ."[3]

The committee also drew attention to two other important aspects of the problem: the need for an integrated approach and the fact that, in the words of the committee[4] in outlining the future work of the League of Nations in this field, "the problem of nutrition is indeed eminently suitable for international collaboration and consultation." This is similar to the statement in the report on the Hot Springs Conference in 1943: "But each nation can achieve its goal [in this field] only if all work together."

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[2] Mixed Committee of the League of Nations, *The Relation of Nutrition to Health, Agriculture, and Economic Policy: Final Report* ("Series of League of Nations Publications" [Geneva, 1937]).

[3] *Ibid.*, p. 35.

As regards the integrated approach to the problem, the committee stated:

"In our interim report we suggested that a national nutrition policy requires the guidance of some central authority with special responsibility in order to utilize to the best advantage the teachings of science, interpret them in the light of national conditions and suggest means for their practical application. In making this suggestion, we were especially influenced by the many-sidedness of the problems of nutrition and by the necessity for coordinating economic and social action with new physiological teachings.

"We are more than ever convinced [this was said after many months' experience] of the necessity for bringing together scientists, economists, agricultural experts, consumers representatives, teachers and administrators in National Nutrition Committees. If, as we hope, our own deliberations have been in some degree useful, it is largely due to the fact that the Mixed Committee has grouped together persons of diverse experience who have viewed the problem of nutrition from different angles—whether of health, of labour, agriculture, economics and finance, social welfare, cooperation or administration. It is our firm conviction that through National Committees adequately representative of the various elements that constitute this diverse problem, the most useful progress can be made."[5]

THE EXPERIENCE OF THE MIXED COMMITTEE

Such committees were later set up by the governments of at least twenty-one states and by the administrations of some twenty-six British dependencies. Some government officials now seem to believe that this recommendation is not of great importance, in that new food administrations have been set up and will continue after the war. Their views are influenced by the fact that governments in normal times, perhaps in all times, dislike interference from without and that some war food administrations, which began by enlisting technical advice and the support of nongovernmental agencies and individuals, have now incorporated such persons into their ranks and have gradually discontinued resort to bodies of independent scientists. It would be a serious mistake to neglect any part of the experience to which the Mixed Committee attached primary importance. However, it was not the purpose of the Mixed Committee to withhold from governments ultimate responsibility for national health and nutrition policy. On the contrary:

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[4] *Ibid.*, p. 51.

[5] *Ibid.*, p. 35.

"While stressing as strongly as we do the importance of National Nutrition Committees, we are fully conscious of the fact—indeed we consider it fundamental—that the ultimate responsibility for the nutrition and health policy of a nation must rest with that nation's government. National Committees, aided where necessary by outside advice, can however exercise an important influence on policy, both directly by their influence on Governments and indirectly in their influence on public opinion."[6]

As the suggestions of the Mixed Committee on national nutrition councils are much more detailed than those of the Food Conference at Hot Springs, it will be worth while examining them closely to throw light on the best methods of setting up such councils.

In its *Interim Report* the Mixed Committee did not find it possible to go beyond the following recommendation: that governments should "coordinate the work done by different authorities which affects the nutrition of the people and, in the absence of a central authority, set up a special body for this purpose, in order to secure unity of policy and direction."[7]

The need for such unity of policy and direction was indeed of primary importance inasmuch as in a number of countries the policies of one department of government, as they affected national nutrition, were likely to run directly counter to that of others.

The Mixed Committee stated that one of the most important tasks of such committees would be to ascertain prevailing food-consumption habits and the nutritional status of all sections of the population. A similar recommendation was made at Hot Springs.

The Mixed Committee laid special stress on "the interpretation of the general rules of national nutrition in the light of national conditions" and went on to explain that "it is an important function of the National Committees to translate these [calories, proteins, vitamins, minerals, etc.] into terms of specific foods, having due regard to the alternative sources from which the different nutrients can be obtained, the consumption habits of the people, the character of national and local production, and the prices of the various foods, etc."[8]

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[6] *Ibid.*, sec. 16, p. 37.

[7] *Ibid.*, sec. 12, p. 55.

The Mixed Committee recommended that these committees should be consulted "on matters of economic, social and educational policy affecting food consumption," that they "should publish periodic reports on the state of nutrition and the aspects of nutrition policy to which they attach importance,"[9] that publicity should be given to their reports and findings, and that they should be able to initiate investigations.

Although generally less complete, the briefer recommendations of Hot Springs are definitely stronger in two particulars: the national nutrition organizations are to have the authority to bring their recommendations to the attention of the public and to those agencies of government which deal with agriculture and the framing of economic and social policy.

The Hot Springs conference also recommended that governments, presumably through the new national nutritional organization, should "reexamine and if necessary reorganize existing agencies, and review legislation concerned with health, agriculture, and nutrition to the end that food and nutrition policies may be efficiently carried out."[10]

THE REPORT OF THE UNION OF SOUTH AFRICA

In this connection, the National Nutrition Council of the Union of South Africa issued a most valuable report on its activities for the period June, 1940, to December, 1943. The report states that "the inauguration of a National Nutrition Council in South Africa came as a direct result of the interest in nutrition which the League of Nations had aroused and stimulated throughout the world since 1935." The first nutrition survey in South Africa, carried on by the Department of Public Health in 1938, "unfortunately proved the existence of malnutrition in a large percentage of the school going population." Feeling that the problem of nutrition in its complexity required a larger and more comprehensive approach than is possible for a single department, the Department of Health strongly urged the establishment of a National Nutrition Council. In 1940 parliament enacted an amendment to the public health act which set up such a council and authorized it to carry out investigations and research into the nutrition of the people and report thereon to the Minister of Public Health. This council was not given any executive powers; its functions were purely advisory. Nevertheless, anyone who reads this first report will become convinced that a splendid start in solving the problems of nutrition in South Africa was made possible by the creation and work of the National Nutrition Council.

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[8] *Ibid.*, sec. 13, p. 36.

[9] *Ibid.*, p. 37.

[10] *United Nations Conference on Food and Agriculture, Hot Springs, Virginia, May 18–June 3, 1943, Final Act and Section Reports; Recommendation VII* (Washington: U.S. Government Printing Office, 1943).

Of particular importance is the composition of the South African council. It consists of twenty-one members, twelve of them governmental, nine nongovernmental. Governmental members are, generally speaking, ministers and the highest administrative officers of the departments of public health, agriculture and forestry, labor, native affairs, and social welfare. Of the nine nongovernmental members, three come from universities (economics, social studies, and medicine), two from the Institute of Medical Research, and one each from parliament, the Agricultural Union, the National Committee for Health Education, and a representative of native interests. These constitute the council proper. But it is noteworthy that the council has set up a number of special committees under the chairmanship of the permanent heads of the departments of public health, social welfare, and agriculture and forestry, which enable it to enlist the advice and assistance of many more government officials and private persons. In addition to its Executive Committee, the council has set up committees on the war emergency, on research, education and propaganda, agriculture and economics. Of particular interest is the Parliamentary Advisory Committee under the chairmanship of the minister of welfare, whose purpose it is "to advise the Minister on nutrition matters from the parliamentary point of view."

Soon after the council began to function, it realized the need of a technical and administrative staff to carry out its recommendations. Accordingly, a Nutrition Section was established within the Department of Health for this purpose. No doubt the success of the Council's work has been in large part due to the efforts of this staff.

Recently the Canadian government has set up a similar national nutrition council, differing in detail from the South African council as problems and conditions of nutrition in Canada differ from those in South Africa.

SIX PRINCIPLES IN FORMING A MIXED COMMITTEE

The Mixed Committee made no attempt to lay down a uniform policy for all countries in this respect. Its recommendation begins with the positive statement: "We have no desire to lay down a doctrine on the constitution and functions of National Committees; these must vary with differences in the administrative practice and traditions in each country."[11]

It would be foolish to recommend the composition of such a council in this country without serious consideration of the complexities involved. But there are certain principles which emerge from experience, in many cases the experience of the Mixed Committee, in others the experience of governments who have set up such organizations.

In the first place, it should have purely advisory functions. The government of the day must not be relieved of ultimate responsibility for the nutrition and health of the people.

Second, it should be composed of members who carry sufficient weight, either in or outside of government service.

Third, all departments, divisions, or bureau of government, directly or indirectly concerned with nutrition, food, and agriculture, should be represented.

Fourth, the organization as a whole should be representative of all the diverse elements and interests that go to constitute this complex problem.

Fifth, the national organization or council should have legal status; its members should be appointed by the chief executive of the government, and its proceedings should be published regularly.

Sixth, adequate funds and competent staff are essential to the success of any such organization.

THE AMERICAN PROBLEM

The American government, which took the initiative in organizing the Conference on Food and Agriculture at Hot Springs, should not lag behind others in setting up a national nutrition organization. It would be a mistake to proceed, however, without careful study of the special conditions and needs in the country. Countries like ours, with a federal system, always experience difficulty in cooperating internationally. The chief concern of the national nutrition organization is to study food-consumption habits and nutritional status of the population and recommend ways of raising consumption and nutritional levels. Nutrition is closely allied to public health, and health within the states is reserved by the Constitution, at least by implication, for state governments. There is no central health or nutrition authority within the federal government, and, in peacetime, work in connection with nutrition is scattered among a number of departments and bureaus.

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[11] *Ibid.*, sec. 17, p. 38.

The first step, however, might be the setting-up of a strong study committee to consider all aspects of the question and to report its findings and recommendations to the president. Such a study committee must include suitable representatives of state and federal governments, but it should, like the proposed National Nutrition Council, be representative of the principal interests involved and include in its membership a proportion of private individuals whose judgment and freedom of expression are not restricted by official status. This study committee might with profit look into the potentialities of the National Research Council, which has set up boards or committees to deal with the scientific aspects of food, nutrition, agriculture, and allied subjects.

The establishment of national nutrition organizations is essential for the success of the Food and Agriculture Organization. This view is based on the experience of the League, which reveals that the setting-up of national committees resulted, as in the case of South Africa, in a great outburst of national activity and in a close coordination of the complex interests involved.

OTHER RECOMMENDATIONS

So far we have dealt with only two of the recommendations of the Mixed Committee. Since the committee's report contains two chapters of recommendations, only a few more can be considered here.

The committee stated that "food consumption levels depend primarily upon two factors—the amount of real income at the disposal of the family or individual, and the intelligent use of that income to meet food requirements."[12]

It pointed out that where income is adequate, the problem is one of education; but that "where resources fall below the limits of reasonable living standards, adequate nutrition cannot be secured by the most scientific expenditure of those resources."

According to the committee, the rise of lower incomes may be brought about by "adding to the total sum of goods and services available for consumption" (which is suggestive of the "expanding economy" of Hot Springs) or by those of lower income obtaining a greater share in existing or increased national income. After drawing attention to such methods as minimum-wage legislation, social insurance, and family allowances, the committee pointed out that the problem of malnutrition is urgent and recommended a series of direct social measures, such as the provision of milk to pregnant and nursing women, children, and adolescents; school meals; and food for the unemployed. It suggested that the state, which has the direct responsibility for the feeding of large numbers of people in the Army, Navy, and public institutions, should insure that "diets adequate in all nutrient constituents are provided"[13] and it also referred with approval to canteen feeding in factories.

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[12] *Ibid.*, sec. 18, p. 38.

The Mixed Committee made equally far-reaching recommendations on the adaptation of agriculture necessary for improved nutrition. Industry and commerce have ready access to capital. This is not the case with agriculture, so that improvement in agricultural credit is a crying need. The whole problem of agricultural indebtedness, insurance, medium- and short-term credit needs to be considered. "We hope," says the committee's report, "that the appropriate national authorities will, in framing their general nutrition policy, give weight to the necessity for developing agricultural credit institutes where adequate machinery does not already exist."[14]

The committee attached "great importance to the encouragement and development of agricultural cooperation."[15] "These organizations should be strengthened and developed in countries in which they already exist and established in countries in which they do not exist."[16]

State action, according to the committee, might impede as well as facilitate the adaptation of agriculture. Thus excessive tariffs and other forms of trade restriction might induce farmers to produce foods for which demand is shrinking and prevent them from expanding the production of nutritionally desirable food. "Subsidies to consumption," said the committee, "on the other hand, may provide equally valuable assistance to agriculture and at the same time serve to promote, rather than to impede, the necessary adjustments."[17]

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[13] *Ibid.*, sec. 36, p. 44.

[14] *Ibid.*, sec. 40, p. 46.

[15] *Ibid.*, sec. 41, p. 46.

[16] *Ibid.*

[17] *Ibid.*, sec. 43, p. 47.

In the field of food supplies and food prices the committee drew attention to the fact that the wide margin between the selling price of foodstuffs at the farm and retail prices had been reduced in some areas as a result of careful study and the use of appropriate measures. The consumers' co-operative movement had succeeded in reducing such margins, which had also been lowered by noncredit shops and special markets. Taxes on imports constituted a major factor affecting the price of foods; each government must weigh the claims of agriculture for protection and of the consumer for cheaper food.

The committee also drew attention to the wide disparity between the prices of foodstuffs in different countries, and even between neighboring countries, and suggested that "governments of all countries with disproportionately high prices of a valuable food, should . . . . consider very carefully whether there are imperative reasons for depriving large sections of the community, whether they be wage earners or others with relatively low incomes, of the advantages of cheap food which are enjoyed by other countries."[18] Finally, in the field of commercial policy, the committee urged the universal acceptance of this one principle, "that adequate nutrition be one of the factors determining such policy. The advice of nutrition and socio-economic experts should, in our opinion, be sought whenever a question of agricultural or commercial policy arises. The National Nutrition Committees which we have recommended would appear to provide a useful channel through which this advice might be obtained."[19]

The Mixed Committee also made recommendations concerning future international work in nutrition. It suggested that the international organizations should act as a clearing house of information on nutritional questions, a function which we hope will be assumed by F.A.O.

The international organizations concerned should assist the national nutrition committees by informing them of the methods successfully employed in the collection and analysis of information concerning food-consumption habits, the nutritive value of foods, nutritional requirements, and food prices.

CO-ORDINATING THE FOOD MOVEMENT

The work of the Mixed Committee was the solid foundation of the international food movement. Before the committee was set up, the elements of the movement already existed, but they were scattered and disconnected. It was the task of the Mixed Committee to bring them together, to fit them into a system, and to give them the unity of purpose and direction which they had previously lacked.

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[18] *Ibid.*, sec. 53, p. 50.

[19] *Ibid.*, sec. 54, p. 50.

By its insistence on the need for integration the committee showed how much importance it attached to the necessity for "coordinating economic and social action with physiological teachings."[20]

This is a lesson we are always in danger of forgetting. The elements which have been brought together in the international food movement have not become accustomed to work in harness together. They have a strong tendency to fly apart, or for one to take the ascendency over the others. The greatest danger in future is that agriculture will overbalance the others and that the F.A.O. may become an organization primarily for the benefit of agriculture. This, in my opinion, would be a tragedy; it would be a loss of much of the ground we have won since 1935. "Food for Health" should be the motto of F.A.O. The final report of the Mixed Committee was on human nutrition and on the ways in which agricultural and economic policy might contribute to health and nutrition. The goal for F.A.O. was set at Hot Springs in terms of human food requirements. This conception must guide every step in the establishment of F.A.O. and must be the inspiration of every one of its activities. For it is the problem of health and human nutrition which is of primary national importance and which should be given full consideration when it comes to setting up national nutrition committees, councils, or organizations.

If the international food movement was born in the 1930's, it has now reached the troublesome years of adolescence. It is our privilege to guard and foster it in this critical period so that after the war it may emerge into vigorous manhood. In so doing we should remember that, in the words of the Mixed Committee, "if the hope which nutrition holds out can be transformed into a reality, entirely new perspectives will be opened for the improvement of human welfare."

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[20] *Ibid.*, sec. 10, p. 36.

THE EXPERIENCE OF ADJUSTMENTS RELATING TO FOODS AND NUTRITION

By JOHN D. BLACK[1]

WE NOW turn to outlining the measures that have been taken to get more and better food actually into the mouths of the underfed larger part of the world's two billion people. These measures can be classified as private, institutional, and public. To cover the first two as well as the latter would extend the task beyond all reason. Consequently, this essay is confined mainly to those which have a large public content. The measures to be considered are mainly those which qualify loosely under the head of what has been called "action programs" in the United States.

It is also necessary to narrow the assignment to the parts of the world and the measures and the period that fall within the writer's sphere of knowledge. The following material relates principally to the United States and mainly to the years during which Dr. Boudreau's international food movement was developing. The food measures that are taken in the postwar years will be more nearly like those of the pre-war years than like the emergency war measures. Some of these war measures, such as in-plant feeding and workers' canteens, no doubt will carry over into the postwar period in one form or another, and some of the important international cooperation that Dr. Boudreau has outlined will continue; but, aside from these, we are likely to take up after the war about where we left off before the war and go on with the measures then in force.

A further important narrowing of the scope of this assignment needs also to be made clear. It is interpreted to mean measures taken with respect to food and agriculture itself, not the whole broad range of measures that have an impact on foods and nutrition.

To illustrate this with respect to employment and wages: No doubt the expansion of demand that came with the war has done much more to increase the use of food than all the direct efforts combined. But surely there is not space enough here for analyzing the wartime food and nutrition problem. Also, the largely futile efforts to restore full employment in the United States in the 1930's, the more nearly successful efforts of the British to the same end in the 1920's, are of the first order of importance as measures affecting food consumption. But it is necessary to forego dealing with these issues in order to treat adequately those measures having to do with food directly.

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The major classification of measures followed is fourfold: *production adjustment*, *consumption adjustment*, *marketing adjustment*, and *population adjustment*. Distinction will also be made between *national* and *international measures*. These measures have a certain historical sequence. The early ones had scarcely an iota of concern over more and better food for anyone. Nor did their sponsors give much thought to more or better consumption as a remedy for the food surpluses then alleged to exist and toward which their measures were directed. Not until after 1935 did consumption-adjustment measures receive appreciable attention. There were persons who talked about underconsumption and "social credit" and wrote books with titles like "The Road to Plenty"; but they were not thinking much about food consumption; and besides they were considered as crackpots and got no measures adopted.

MARKETING ADJUSTMENT, 1920–40

A reasonable expectation would have been production-adjustment measures immediately following the last war. The common explanation, at the time, of the surplus condition that appeared at the end of the last war was that the food-exporting nations had overexpanded their production. The logical correction for this was contraction of production. But this was not proposed. Marketing adjustment was advocated instead.

Why not production adjustment? Because the prevailing notion of this country and other exporting countries was that they could dispose of their surpluses by dumping them in Europe. The exporting countries of that time worried very little about the ability of the importing countries to take their foods and pay for them. They concerned themselves not at all with the adjustments in consumption required in these receiving countries if they were to take more of our exports.

The tariff policy of this country has always made these same bland assumptions. We try to export just as much as we can and buy as little as we can. And so with most other food-exporting countries. Little thought is given to the receiving end of the exchange.

The real motive behind the marketing-adjustment measures proposed was to get higher prices for the food producers. Marketing control was incidental thereto. In Great Britain the first action taken was the direct fixing of the prices of farm products at cost of production. This measure was dropped like a sizzling hot poker as early as 1921. Then some use was made of protective tariffs and import quotas. What finally evolved was provision for "agricultural marketing schemes," which were government-supported domestic monopolies coupled with a certain amount of import control. The special wheat program levied an import duty to raise money to subsidize the home producers. Of course, this whole British program was activated in part by military security objectives—the desire to expand agriculture so that the British Isles would be less dependent on the continents.

The United States began by raising the duties on all farm products in 1920–21. Some of its agricultural leaders had discernment enough to realize that this did not raise prices of export commodities, although the chairman of the Finance Committee of the Senate, and hence joint sponsor of the tariff act of 1921, Senator MacCumber, expressed himself to the effect that "he believed that a little tariff was a good thing for any farm product." Accordingly, a strenuous but futile effort was launched to "make the tariff effective" on export products, by a measure that would have forced the export of enough of them to create a domestic scarcity and raise the home price to the world level plus the tariff duty. Be assured that the possible humanitarian motive of making these foods a little cheaper in the receiving countries was not in the picture.

The Coolidge-Hoover program—perhaps better called "Hoover-Coolidge"—enacted into law in 1929, was for the government to help the agricultural co-operatives, and especially to help them to raise the prices of farm products, by creating a set of "farmer-owned and farmer-controlled" national co-operatives that would feed the products to the market in such a way as to obtain the highest possible price for them, meanwhile loaning them money with which to do this. Also quasi-public agencies, called "stabilization corporations," were set up to do the same thing. To be sure, there was talk about how these co-operatives would make marketing more efficient; but the real drive behind these measures was the use of monopoly position to promote "orderly marketing" and to raise prices.

A little of this type of control carried over into the New Deal legislation in 1933 and after, although it was mostly production adjustment. In fact, the federal government still issues "marketing orders," jointly with the distributors and the co-operatively organized producers, in a score or more interstate milk markets, and thirty-odd state milk boards control milk marketing in intrastate markets.

Then, as production adjustment failed to do the whole job in the later thirties, interest shifted partly back to marketing again. Marketing adjustment really came back into the program with the adoption of Mr. Wallace's "ever normal granary" scheme. The early objectives of this granary program were the "orderly-marketing" proposals of the twenties; but these were supplanted by price-fixing motives as the loan values were raised nearer and nearer to parity.

On the continent of Europe, marketing adjustment generally took the simple form of import duties and quotas. The duties applied just after the war were partly directed at making these countries more nearly food self-sufficient. In the depression that set in in 1929, they were hiked up to new levels mainly to help out the farmers.

Other food-exporting nations—like Canada, Australia, Argentina, and so on—commonly made use of some form of export subsidy, or simply held part of their product off the world market, as did Brazil with its coffee.

PRODUCTION ADJUSTMENT, 1930–40

The primary, almost the sole, purpose of all the production-adjustment measures was also to secure higher prices for the producers. Military security was often an incidental purpose in Europe, and balance of payments in a few instances. That they would raise the cost of food to the people of the country was a matter of little concern. The farmers, it was said, could not be asked to feed the rest of the people at an unfairly low price.

A few in the United States began talking, as early as 1922, about the need for "orderly production" as well as for orderly marketing. The "outlook program" was started in 1923. Its conception was that if the producers of food and fibers were told in plain language, while they were still making their plans for next year's production, what the price outlook was for the different products, they would make the needed shifts. It soon became evident, however, that many of the farmers needed help in finding out what other products they could best turn to, or what was the best rebalance of their production program. So the outlook program began growing into an "outlook *and adjustment*" program. The adjustment part of it never received much support. Congress and Mr. Hoover took no interest in the Christgau Bill, introduced about 1928, which proposed an intensive organization for helping farmers to plan their production programs.

Instead, Mr. Hoover and Congress passed the Agricultural Marketing Act of 1929, which was solely a marketing-adjustment measure, one of the major accomplishments of which was to hold American wheat and cotton off the world market and accumulate it in government hands. The act itself included a few sentences about production adjustment but provided no implementation of any kind for it. Shortly, the Federal Farm Board—the agency administering the 1929 act—found itself virtually helpless, with about all of its half-billion-dollar revolving fund tied up in products held either by the "farmer-owned and farmer-controlled" national co-operatives it had created or by its "stabilization corporations." In consequence, as early as 1931, it began asking the wheat and cotton growers to shift to other lines of production. By 1933 the thinking of the country, including the Board, had turned almost completely from marketing adjustment to production adjustment. The Agricultural Adjustment Act of 1933 was a catch-all measure, with a little of almost all forms of adjustment in it. Even dumping abroad, according to the proposals rejected in the 1920's, could be resorted to, and was in a small way when wheat was sent to the Orient. But its main line of attack was to curtail production, reduce the export surpluses, and raise prices. Producers were bribed into shifting out of the surplus lines or in some cases penalized if they didn't. From voluntary adjustment, as proposed in the Christgau Bill, the country had adopted enforced adjustment.

The original Adjustment Act itself contained no provisions for aiding farmers to shift in the right direction. Any help the farmer got in this came from the Agricultural Extension Service. Some of the drafters of the measure, however—and certainly some of those called upon to administer it—had a strong interest in getting sound production programs substituted for the old ones. It is no misstatement to say that this group was responsible for the middle "A" in A.A.A., and that the *adjustment* they had in mind was not just adjustment out of cotton production but also into other more desirable lines. Mr. Howard R. Tolley and his group in the Program Planning Division of the A.A.A. worked out an analysis of these adjustments in terms of the diets at "four levels of consumption" that H. K. Stiebeling and Medora Ward had described in their landmark U. S. Department of Agriculture Circular, No. 296, *Diets at Four Levels of Nutritive Content and Cost.* And they pointed out the need for shifting considerable of our production away from cereals and cotton toward dairy products, meat, eggs, vegetables, fruit, and other protective foods.

Then when the act was largely redrafted in 1936 and Mr. Tolley was put in charge of its administration, the bribes to farmers were conditioned upon the crops and products *to which* the farmers shifted as well as those *from which* they shifted. It therefore became, on paper, a full-fledged two-way production-adjustment program. Those who administered it needed to concern themselves almost as much with the crops expanded as with the crops contracted. The basis for the payments, however, it is highly important to make clear at this point, was not *consumption* needs but *soil-conservation* needs. These two needs, fortunately, ran together a good part of the way. This was not wholly a coincidence, for Mr. Tolley and his program-planners had consumption needs also in mind. But not many did among those who were finally responsible for enactment of the Soil Conservation and Domestic Allotment Act of 1936.

The qualification "on paper" (above) needs clarification. In operation, the 1936 act realized only in minor measure its possibilities. For one thing, too many of the producers of the basic crops were not much interested in substituting other crops for cotton, wheat, tobacco, corn, and rice. They were willing to grow fewer acres of these *provided* they got a satisfactory income from the fewer acres. Then when the new price declines came, in 1938, they converted the 1936 act in good part into an instrumentality for passing out checks while they kept on producing altogether too much as before. The final step was raising the loan minimums on the "granary" stocks to 85–90 per cent of parity, so that they virtually fixed prices at these levels.

The producers themselves should not be charged with all of this. Cotton-minded, wheat-minded, tobacco-minded, corn-and-hog-minded, cattle-minded, and dairy-minded political representatives of these producers took stronger positions than the rank and file of the producers themselves. These men had grown up, politically, thinking of their constituents in terms of cotton, wheat, tobacco, corn, cattle, and dairy products, and the prices of these products, and not in terms of desirable alternative lines of production. Farm-organization leadership tended in the same direction. There was an equally strong prepossession with old cropping or livestock systems on the part of the agricultural colleges and extension services. Finally, the A.A.A. organization itself came increasingly under the domination of groups within it who had strong commodity and regional points of view of the sorts described. This was particularly true after Mr. Tolley was replaced as administrator, which was partly a result of frictions engendered by his efforts to curb these influences and achieve full production adjustment.

This is not to be understood as a statement that all the efforts from 1933 to 1941 contributed nothing in the way of desirable production adjustments. The immense production of the recent years is to be attributed in some part to soil improvements resulting from the A.A.A. programs. But the achievement was small in proportion to the funds and the effort that went into it.

A statement on another point is needed here. Was this a "scarcity" program or was it not? In final effect, it certainly was not. Agricultural production was as large in the United States in 1940 as it would have been with no A.A.A. program. Moreover, the program was a little better balanced as a result, and the land was in better condition. Wartime production has been larger and better distributed because of the A.A.A. program. But what about *intentions?* A majority of the A.A.A. staff members—federal, state, and local—and some of its high officials have been scarcity-minded and have sold their ideas of this sort to a million or so of our farmers. The most favorable statement of their position that can be made is that they have held to the general philosophy that industry manages to reduce its output when prices sag and that agriculture must learn how to do the same thing and needs the help of government to do this. The best statement of the position of those who have thought like Henry Wallace and Howard Tolley is that they have wanted to reduce total output of food calories but increase the output of proteins, calcium, vitamins, and minerals in the form of protective foods. They realized that this would raise the general level of prices of farm products; in fact, they believed that farm incomes were unbearably low and needed to be raised. And they recognized that consumers would need to have more purchasing power to buy this more expensive combination of foods. Hence they favored a consumption-adjustment program to go with the production adjustment.

Mention must be made briefly of other production-adjustment efforts in the United States. First, those of the Farm Security Administration. In the farm and home plans that its staff has worked out with the half-million or so farm families who have received "standard" rehabilitation loans or tenant-purchase loans, a thoroughgoing job of production-adjustment programing has been done. The actual farm plans have often been defective. Not enough persons have been trained in this country to do this kind of planning. But the point is that actual plans were made. Here is a farm-by-farm approach, in contrast with the general blanket approach of the A.A.A. It offers more possibilities for the future in this country than does the A.A.A. method. In fact, it may be the only approach that we can safely take. The Soil Conservation Service also does individual farm planning, directed primarily, however, toward control of water and wind erosion. Its plans could be fitted into all-round production adjustment. It is obvious, also, that both the F.S.A. and the S.C.S. farm planning will need national and international orientation if they become our sole reliance in this country.

The Agricultural Extension Service has of course given some attention to production adjustment over the years, especially since the Outlook Program was initiated in 1923. In general, its emphasis has been much more on technology than on production planning. The county-planning program, begun in 1938 under the leadership of Mr. Tolley and the Bureau of Agricultural Economics, offered the Extension Service large opportunities to shift more emphasis to production adjustment. It is probably not unfair to say that the Extension Service did not appreciate these opportunities enough, or soon enough, to keep the program from being largely pinched off by the combined opposition of farm organizations which did not want any concerted effort by farmers in the counties except under their own direction, and of the S.C.S., which wanted no over-all plans developed out in the counties except their own somewhat limited-objective plans.

Among production-adjustment measures in other countries, we come first to the international commodity agreements. Their controls have thus far usually been imposed at the point of export, but each signatory nation has accepted the obligation of keeping its production from exceeding its export quota. Thus in the present International Sugar Agreement, signed in 1937, each country has not only been given a limited export quota but has been required to supply one-fifth of this quota out of its accumulated stocks. The deficit countries are required not to expand their domestic production. Under the present limited Wheat Agreement, signed in 1940, the four exporting countries pledge themselves to "adopt suitable measures to ensure that the production of wheat in their territories does not exceed the quantity needed for domestic requirements and the basic export quotas and maximum reserve stocks for which provision is hereinafter made."

The commodity-agreement movement got under way before the A.A.A. The first sugar agreement—the so-called Chadbourne Agreement—was made in 1931. The first attempt to draft a wheat agreement was in London in 1931. The first Wheat Agreement, which lasted only a year, was made in 1933. The Beef Agreement dates from 1937; the Coffee Agreement from 1940.

Exporting countries other than the United States that have undertaken price-supporting have usually found it necessary to do something about production, but the writer is not familiar with the details. The Brazilians, it is common knowledge, after accumulating and destroying large stores of coffee, finally resorted to penalties on additional plantings.

The deficit countries wanting to expand production of certain products have made use of tariffs, price guaranties, subsidies, credit, and technical aids. All are effective. In agriculture, expansion is always much easier than contraction.

CONSUMPTION ADJUSTMENT, 1935–40

The story of consumption-adjustment measures, up to the time of the present war, can be very brief if we omit educational measures, such as the work of the home demonstration agents of the Agricultural Extension Service. This decision not to deal with these is not to be taken as belittlement of their importance. They have played a large part, merely to illustrate, in the increased use of dairy products in this country. They have contributed much more in this country in the last twenty years to the increased consumption of green, leafy, and yellow vegetables and tomatoes than heavy advertising has contributed to the increased consumption of citrus fruits. Without the aid of any advertising programs, the increases in acreage shown in the accompanying tabulation took place between 1919 and 1939. Spinach is not included in this list because some might say that it has been well advertised by "Pop Eye." Its acreage increased 590 per cent. The parallel increase for the greatly advertised citrus fruits was only 106 per cent.

Tomatoes	64 per cent	Asparagus	300 per cent
Celery	80	Green beans	310
Green peas	196	Lettuce	475
Kale	290	Carrots	745

The first direct measures taken in this country to secure a wider distribution of surplus farm products were for wheat and cotton, through the American Red Cross, in 1932. Distribution among families on relief expanded after 1933 and evolved into the school-lunch and food-stamp programs, the first being still in operation. The 1933 Adjustment Act expressed a little solicitude for the consumers, but provided nothing for them except that it permitted use of the income from the processing taxes to be used for diverting surpluses of agricultural products to domestic relief purposes and to expanding domestic and foreign markets. Part of the meat and lard from the pig-slaughtering program of 1933 and the meat from the cattle-purchase program in 1934 found their way into relief channels. Then in 1935, specific provision was made for using up to 30 per cent of the customs revenues of the country for diverting farm products "outside the normal channels of trade and commerce."

The object of these provisions, of course, was mainly to take these products off the market and keep them from depressing prices. But two other circumstances figured in the growing support for such measures: first, it was hoped that people on relief would form habits of using these foods, especially the school children; and, second, the congressmen were not very happy, after all, about having want and surplus in such close juxtaposition.

The direct distribution of food was objected to increasingly by the retailers—it was encroachment by government. They proposed the stamp program as a way of using them to do the distributing; and Mr. Wallace and Milo Perkins took them up on their offer. It made possible larger public acceptance of relief distribution of foods. It and the school-lunch program became the two principal outlets for surplus food distribution.

Even at its peak just before the war, the amount of money spent on food distribution equaled not more than a fifth of what was being spent by the A.A.A., not to mention the advances to the Commodity Credit Corporation for the purpose of supporting prices. And in the last few years before the war the diversion programs met objection from the farm bloc because the appropriations for them began to come up in Congress in such a way as to suggest that they were taking the place of appropriations for benefit payments. The farm bloc congressmen preferred a check in the hand of the farmer, and price bottoms at 90 per cent of parity, to the intangible gains of improved prices from surplus diversion. Even the school-lunch program came to be opposed.

Yet a good basis can be established for the judgment that, if the half-billion dollars or more a year spent from 1933 on for production-control bribes and rewards for improved practices, had been used on the diversion programs instead, it would have added fully as much to the income of the farmers, and the low-income families of the country would have had the food to eat in addition.

But whether or not such a conclusion can be established, a considerable body of public opinion has come to accept it. Of the three types of adjustment that have been discussed, it is safe to say that consumption adjustment now stands highest in public favor.

The ways and means of consumption adjustment, however, have been very little developed. Disposing of occasional surplus foods for such a purpose is only a makeshift. When the war broke out *the nation still had ahead of it the task of developing systematic procedures for ascertaining the nutritional deficiencies of its people. by areas and groups and of helping them to make the adjustments that will correct these deficiencies.*

The most significant single achievement along these lines, other than the general educational effort, is again that of the F.S.A. In its farm and home plans it has set up adequate food budgets and then has worked out the means by which the family can obtain these budgets. The home-demonstration workers are beginning to use similar techniques. Hence, so far as farm families are concerned, the foreview is encouraging.

One of the great merits of the F.S.A. approach is that it integrates production and consumption adjustment on the individual farm. This same integration is needed in the larger national and international spheres.

As for the rest of the world, in only two or three countries at the most had consumption adjustment made as much headway, by 1939, as in the United States. *The scientists of the world know a vast amount that could be highly useful about foods and nutrition. A good bit of this knowledge has become the intellectual property of the educated classes. But only in a small way is this knowledge being applied to the diets of the great masses of humankind.*

If we were to include nonagricultural measures having an impact on food consumption, it is at this point that they would be introduced. There would be discussion of how the rising tempo of business activity in the later 1920's increased the consumption of dairy and poultry products, and how the following depression reversed these changes, of the measures adopted in the 1930's to increase workers' incomes and the general ineffectiveness of wage increases that were offset by reduced employment, and of parallel undertakings in other countries, up to the time that preparation for war furnished new work opportunities.

POPULATION ADJUSTMENTS

The task of population adjustment is to redistribute and dispel surplus populations and prevent their occurrence. Production and consumption adjustment can help greatly in improving the food supply and nutrition of many peoples now pressing hard on their resources; and industrialization can help even more importantly in others. But in large segments of the peopled earth, these alone will not suffice—the ratio of population to land and all other resources combined is too high.

In the United States this ratio is surely too high at least in the southern Appalachian regions, the Ozarks, and the Spanish-American communities. If the families now living in these regions concentrated all their productive efforts on procurement of the right foods and on the bare necessities of existence for the rest, they might get enough of the right nourishment. But a high order of food management would be required; and they must not increase these numbers further, and their birth rates are the highest in the country. Attempts to deal with these areas by planned resettlement in the thirties were largely futile.

So have they usually been in most other countries. Migration, industrial revolution, education, and sanitation have been the really effective processes. In combination with improvements in the arts, these have brought the populations of much of Europe in much better relation to resources than in Malthus' time. Similar processes will have to carry the burden of population readjustment in the rest of the world. This does not mean, however, letting things drift. The right changes need to be facilitated in all possible ways. The time has come for consciously directed national population policies and programs.

THE WAR YEARS

The adjustments of the war years can be summed up very briefly. The need for food in the countries at war has been considerably increased, and the farms of these countries have met this need in spite of losses of great numbers of workers and shortages of machinery and supplies. It now looks as if there will be food enough on hand or in prospect, if 1945 production is maintained at a high level, to feed the devastated and reoccupied areas at their accustomed levels until they can restore their agriculture. The methods that have been used in the different countries to get out the production have been simple in the main—assured high prices and outlets, supplemented, on the one hand, by threats of shortage of particular foods and foods in general, and on the other, by setting up production goals that indicated the extent of the needs. These goals have had the great merit of pointing the direction of needed shifts in production. The price guaranties have been related to these goals, although not always consistently—for example, in the United States, cotton prices have been supported, even though we needed to have considerable of the cotton acreage shifted to peanuts, soybeans, etc.

The shifts in production have in general been well selected. They have called for increase of potatoes, vegetables, vegetable oils, milk, and eggs and to a slight extent a shift toward cereals and other high calorie-yielding foods and away from beef and lamb. One is surprised to see how little of a shift in this direction has sufficed. Even this World War has not forced the nations not blockaded to extend themselves greatly to meet the demands for food or to make any drastic dietary changes.

The actual intake of food has increased in amount and improved in balance during the war in all but the occupied countries and India, China, Puerto Rico, and much of Russia. The major reason for this has been more income with which to buy food. An important secondary one in the United Kingdom has been supplementary food distribution in factories, schools, canteens, and among preschool children. The United States has shifted away from such distribution, except for retaining part of its school-lunch program and except for getting an in-plant feeding program well under way.

Rationing has given the lower-income group of the United Kingdom, and no doubt in some of the countries on the Continent, a larger share of essential foods than they had before the war. This is even true in a small way in the United States. Price control has been a necessary supplement to rationing. Both of these, however, are measures made necessary by war conditions, and not much of them can be expected to carry over into the peace. The same is largely true of the marketing controls set up in the United Kingdom and of Lend-Lease in the international field.

Another line of development has been the giving of more attention to the processing of foods and to the preserving of their nutritional values. The reinforcement and related programs are illustrative.

Finally, the leadership movement that Dr. Boudreau described has received a powerful impetus from the war, and more groups in society and many more families have become awakened to the importance of good diets.

LESSONS FROM THIS EXPERIENCE

Somewhat by way of summary, it may be safe to line out a few tentative conclusions.

First, as to the marketing-adjustment measures. Those of the interwar years were largely futile from the standpoint of their purposes at the time and damaging from the viewpoint of better provision of food for the nations using them. The "ever normal granary" type of measure can be useful both nationally and internationally—it was proposed at Hot Springs under the name of "buffer stocks." But it lends itself to easy abuse. It requires a kind of administration that insulates it in part from the pressure of commodity interests.[2] The emergency measures adopted for distributing food during the war, especially the controls set up in the United Kingdom, and Lend-Lease in the international sphere, contain features that could be advantageously carried over into the peace, but are likely to meet opposition from the proponents of "free enterprise."

The production-adjustment undertakings of the interwar years that called for expansion were successful everywhere. Those that called for contraction had indifferent success except in the very short run. Nevertheless, measures of the latter sort are needed.

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[2] The writer, with Stanley S. Tsou, has discussed these points at more length in an article on "International Commodity Arrangements" in the *Quarterly Journal of Economics*, August, 1944.

Output of some types of farm products tends to run ahead of consumption for periods of three to ten years at a time, and something more than granary and surplus-disposal measures are needed to cope with this. But such measures encounter the same types of commodity interest pressures as do the granary measures. Emphasis in such production adjustment needs to be placed on the expansion of products that take the place of those in surplus rather than on the contraction of the surplus products. Payments to producers in connection with such schemes should consist only of aids in making specific readjustments. Considerable aid of this kind is going to be needed in many countries when the war demands for food end. Price supports, such as are now provided in the United States and more recently in Canada, should be interpreted only as temporary shelters while these readjustments are being made—and they are always in danger of delaying readjustments.

In the aggregate, however, much more reliance should be placed on consumption than on production adjustments. Wherever a surplus situation can be handled by disposal of the product among underfed people—first, in one's own country, and second, in other countries—this should be the solution. But consumption adjustment involves much more than emergency disposal of surpluses. Long-standing insufficiencies of vital foods by large masses of the population need to be attacked systematically, first by finding out what they are and then by setting up programs for securing the necessary foods in one's own country if this is not importantly wasteful of resources, by importation if this is comparatively advantageous. The F.A.O. needs to make the development of such programs its particular task. Production adjustment and consumption adjustment need to be integrated not only within countries but among countries.

Measures for fundamental population adjustment are a necessary supplement to the foregoing in large sections of the world. Emergency population adjustments, like resettlement, are not likely to be very helpful. The measures needed are those that hasten the usual processes of migration out of surplus-population areas, stimulate the growth of industries in these areas, and bring more and better education and health to the congested areas.

Finally, all four of these types of adjustment need to be integrated within any country, as well as internationally, into harmonious and consistent programs pointed strongly in the direction of more and better food for all nations.

OBSERVATIONS OF PARTICIPANTS

THEODORE W. SCHULTZ (University of Chicago): To what extent was there a public opinion, a public awareness, with regard to nutrition arising in western European countries in the thirties, and to what extent did it have a root in agriculture?

FRANK G. BOUDREAU (Food and Nutrition Board): It is difficult to form an idea about public opinion in any country. What may be said is this: that the studies of the Mixed Committee of health and nutrition of the unemployed in a number of countries did make considerable stir. They were carried on in a number of countries—in Holland, for example, they made a big impression. That was one thing.

Another thing was the setting-up of national nutrition organizations or committees in twenty-one countries, which included most of the European countries. These brought into the discussion of nutrition many farmers and leaders of farmers' organizations, and in one or two countries this was an important development.

JOHN B. CANNING (War Food Administration): Of the several types of adjustment, which would be called for during the postwar period?

JOHN D. BLACK (Harvard University): The Farm Security Administration is working out farm-by-farm production plans for the individual farmer. That is something that can be multiplied indefinitely but is very expensive and slow-moving. In the stressed conditions with which we shall be confronted immediately after the war, we must undertake more vigorous over-all measures along with this; but they will serve as rather temporary expedients until we can get something more systematic, fundamental, and thorough.

W. H. NICHOLLS (Iowa State College): One of the shortcomings during the war in government has been the fact that the labor group has been largely working through one administrative organization and agriculture through another. The same thing has been true on the legislative side—specialized agricultural committees and labor committees each working on specialized problems and each favoring a particular pressure group. What form of food organization would provide the best channel for reconciling the conflicting claims of labor and agriculture in a democracy?

Mr. Black: We have developed one promising technique in this country in the National Planning Association. Professor Schultz is chairman of the Agricultural Committee of this association. They have given me the task of working out, with a committee of twenty-odd people representing agriculture, twenty-odd people representing labor, and twenty-odd people representing business, a joint statement and a joint program on food and nutrition for this country.

Mr. Nicholls has said that as things have worked out, we have a labor clique with a labor representation in Washington and an agricultural clique and so forth, and they don't get together. The National Planning Association is set up to bring the three together and prepare joint programs and joint statements, and we can do it if we work at it hard enough. But you have not got anywhere if you just *prepare* one of these statements; you have to work it out; someone has got to come along and set up the machinery for carrying it out.

Mr. Boudreau: The Canadian Board is more largely governmental. A national nutrition organization must necessarily be led by government. What we want from the outside is the independence of the individual scientists.

Howard Tolley (Department of Agriculture): Dr. Boudreau stated that the big problem will be to keep agriculture from overshadowing food. There must be lots of points of common interest between food production and its consumption, between agriculture and food. What are some of them? Is the revivification and modernization of the stamp plan one of them?

Mr. Black: This is really what we are trying to do in our National Planning Association Committee—to make up a program of things on which these three groups will agree. We have the food distributors to bring into this as well as the food producers and the consumer groups and labor. It didn't take very long to get out a few tentative statements. Very vigorous reactions were registered. To illustrate: a commissioner of agriculture, in one of the border states, wrote: "Your statement indicates that people should have enough to eat under any and all circumstances. With this I disagree. If people won't work they shouldn't have enough to eat. I am so positive on this point that if you will agree to meet me in Washington, I will come up and have a session with you on it."

This is the type of reaction that one runs into among those groups. There is more support for the school-lunch plan than any other of these supplementary food programs. In-plant feeding has been developed in this country during the war, and the labor groups are going to support it and continue it after the war. But the kind of an in-plant feeding plan that can be worked out in peacetime jointly between the labor groups and the employer groups has not been established as yet.

The United Kingdom people developed distribution of orange juice and milk among preschool children. We need to get at the children who don't have enough of these things before they go to school. We haven't done anything of this sort in this country.

We have run into the worst clash over how to get food consumption increased. A strong contingent in the business field thinks that the way to do it is to advertise. Others, as you are probably aware, think that this is not very effective compared with some other approaches.

M. R. BENEDICT (University of California): The expenditure of funds on educational programs is very large. We probably ought to think in terms of the various possible ways of implementing better diets, and possibly advertising is one of them if we can get advertising under control so that it is constructive rather than merely used to delude the public.

MR. BOUDREAU: We had a number of schemes in this country for distributing food to the people who needed it, and it was based on surpluses. By-and-by we didn't have any surpluses, so it faded away, and now we are just clinging by the fingertips to our school-lunch scheme. It has been a wrong foundation for schemes of that kind. What are the schemes in Great Britain and will they continue after the war?

E. TWENTYMAN (British Food Mission): The most important scheme, perhaps, is the national milk scheme which provides milk for school children and for preschool children, for infants and pregnant women and nursing mothers. Its purpose is to insure priority of supply to these groups in nutritionally adequate quantity. This scheme will undoubtedly continue after the war.

There is a scheme for distributing orange juice, which is obtained under Lend-Lease, to infants. There also are schemes for providing extra rations for workers in various categories through canteen meals. That will continue after the war, although the orange-juice scheme probably will not. The British restaurants have a scheme for feeding workers generally—that is, it is intended primarily for workers who do not have facilities for extra feeding at their places of work—the Canadian scheme being confined to factories employing two hundred and fifty people or more. That will almost certainly not continue after the war, mainly because it arouses and has aroused from the beginning much opposition from the caterers.

MR. BOUDREAU: You have not said anything about school lunches.

MR. TWENTYMAN: That was a pre-war project, as was the milk-in-school scheme. In fact, it never before the war assumed very large dimensions. It was a permissive scheme, which depended upon the voluntary co-operation of teachers and other people. It was financially supported by the local authorities and the central government, but it was in no way compulsory on the school authorities. It has been fairly substantially expanded during the war; but even now it does not by any means cover the whole area of the school population. The school-meals scheme is likely to be continued and increased. It is now recognized as being an important factor in public health.

MR. BOUDREAU: The moral is that if you will base these schemes upon nutrition rather than upon surplus, they are more likely to continue and become a part of the social institutions of the country.

MR. TWENTYMAN: In England it is correct to say that they are based not so directly upon nutrition policy as upon the recognition that food economy and nutrition economy are made necessary by shortages.

It is off the subject, but I should like to go back to the question that Mr. Tolley raised, which interests me very much. It is the question of how the various groups that are interested in this general subject from different points of view are to find a common ground.

Dr. Boudreau stressed the importance of the work in nutrition that has been done by the League. Would he agree that nutrition work would not have gotten very far—for some time, at any rate—if it had not been for the war? In England nutritionists were not regarded favorably at the beginning of the war. Now they are held in high esteem. Would the marriage of food and agriculture, which was a pre-war conception of the League, have reached anything like its present position, and would nutrition and nutritional science be making, as they are doing, an active and positive contribution to policy, if it had not been for the war? And if that is true, does it not indicate a danger that in the postwar period we may go back to the state of affairs in which the nutritionists go merrily along doing satisfying work but not being able to make it effective?

It seems to me that this is a fundamental problem for the F.A.A.—that it must be so organized and its work so arranged that the marriage of food and agriculture will be a reality. That is to say, that it must insure effective combination between the varying interests—consumers, producers, nutritionists, and so on.

MR. BOUDREAU: Mr. Twentyman has put his finger on the real difficulty in the future. As he indicates, nutrition comes to the fore in times of depression, in times of crisis, or in time of peace. Furthermore, we have to prevent this departmentalization. One way to avoid this is to set up the proper kind of a national nutrition organization which will be intrusted with the formulation of policy and make it representative of all the complex interests and give it funds and authority.

R. J. EGGERT (American Meat Institute): Has the nutritionist given enough attention to palatability, in addition to vitamins and proteins and other desirable chemical characteristics of food?

A. C. ELVEHJEM (University of Wisconsin): We do not have to worry too much about the palatability of food. Some nutritionists like to advise us to eat the most unpalatable foods we can find, but, in general, nutritionists have been very kind to us. They have found vitamin C in orange juice, and nearly everybody likes orange juice. We do not have to go to any bitter material to get our vitamin C. And those who do not like orange juice have it in tomatoes.

As we learn more about nutrition, we find that the essential nutrients are widely distributed in foods that are palatable, and, furthermore, studies have shown that we can prepare foods in palatable forms. We can cook and process foods without destroying too large a percentage of the essential nutrients.

Another matter which is going to develop in the future: we have gone through the period when the manufacturers of vitamins have tried to get us to consume our vitamins in capsules and pills—which are unpalatable to most of us—and these vitamins will later be put into palatable foods. Fortification of bread, fortification of oleomargarine, and so on.

PART II

POPULATION

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POPULATION—THE LONG VIEW

By FRANK W. NOTESTEIN[1]

PERHAPS the greatest hazard in the way of forecasting population trends has been the disposition, both of the makers and of the users of predictions, to treat population growth as an independent variable; to view growth as a dynamic response to laws of nature moving irresistibly toward an inevitable goal. From such trends economic and political conclusions of great weight are readily drawn. It is no less true that population growth itself is a dependent variable, to be affected in large degree by the technological, social, economic, and political developments of the future. The nature of population growth will affect, and in turn be affected by, coming events. We too often fail to consider the response of population growth to the changing setting.

Of course, there are elements that give great inertia to growth. Under favorable peacetime conditions the average length of life is approaching sixty-five years. The maximum limit of the population that will be over age sixty in the year 2000 has already been set. All of that group is now living. Even the number of children to be born between now and 1965 has been directly affected by past events. The maximum limits of the parental stocks of 1960 have already been determined. Furthermore, human mortality and fertility move in response to rather well-known factors, some of which are in a measure predictable. Clearly, growth processes contain many predictable elements.

The difficulty is that the predictable elements tend to attract our attention to the exclusion of the less predictable ones. We tend to assume the existing technological, social, and political setting as the background. The overwhelming temptation is to project the future within the general framework of the present. All things considered, this temptation is probably fortunate. Judgments as to the future of population growth must be made explicitly, or implicitly, in terms of social policy. The predictions are better made on the basis of a general setting that we know, or at which we can reasonably guess, than in terms of a setting concerning which we can only hope or dream. The difficulty, then, is not that of making predictions in terms of the present, or a reasonably anticipated, setting. Rather, it is that of taking the predictions too seriously once they are made. Having introduced assumptions concerning the governing conditions, we must constantly keep in mind the fact that they are assumptions and that a different course of events would lead to different answers.

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This paper draws on materials developed for the Division of Geography and Cartography of the Department of State and on materials developed with the financial assistance of the Milbank Memorial Fund and the Carnegie Corporation of New York; however, none of these agencies is to be understood as approving the statements made or views expressed in it. In all matters of fact or interpretation the author alone is responsible.

With this warning in mind, we shall consider, first, the course of past developments and something of the processes of past change; next, examine in greater detail three types of population change; and, finally, present some hypothetical population trends for the future, on the basis of which we can discuss the actual prospects for population change.

PAST TRENDS AND PROCESSES OF CHANGE

The world's population has increased fourfold since the middle of the seventeenth century. It has more than doubled since 1800 and even now continues its rapid growth. These trends may be seen from Figure 1, which presents the data for the world and its major geographic areas on a logarithmic scale.[2] This scale permits the comparison of rates of change but sharply distorts the amounts of change.[3] Obviously, the values are estimates even at the most recent dates. In the cases of Asia, Africa, and Central and South America they are little better than informed guesses. For China, opinions concerning the size of the present population differ by more than the total population of the United States. Nevertheless, the chart gives a description of the course of population growth sufficiently accurate for our purposes.

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[2] Values for the years 1650-1900 are from A. M. Carr-Saunders, *World Population* (Oxford: Clarendon Press, 1936), p. 42. Much of the following discussion is based on this valuable work.

[3] E.g., between 1850 and 1940 the line for Oceania rises about three times as far as that for the world. This indicates that its rate of growth was about three times as fast as that of the world. In absolute numbers the sharp rise for Oceania represents a gain of less than 9 million people, while the small rise for the world represents nearly 900 million people.

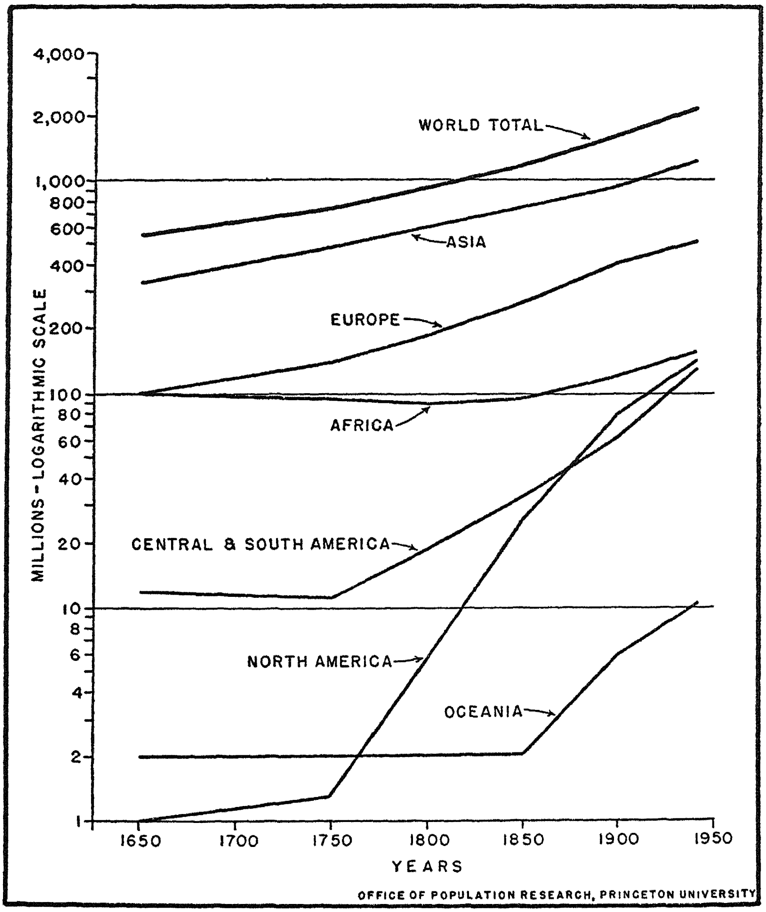

FIG. 1.—Growth of population by continents, 1650–1940 (data for 1650–1900 from Carr-Saunders, *World Population*, p. 42).

The figure brings out three facts pertinent to this discussion.

1. The world's population has been growing at a rapid and accelerating pace during the last three centuries. Since the middle of the seventeenth century it has grown at an average annual rate of about 5 per thousand. Since 1900 the annual increase has averaged 8 per thousand. Such prolonged and rapid increase cannot have occurred frequently in the history of the race; and, obviously,

increases of this magnitude have never occurred before. For example, if the average rate of increase obtaining since 1650 had been in force since the beginning of the Christian Era, an initial population of only 10 million would now amount to more than fifty times the present world population. The modern epoch of growth has been unique.

2. All sections of the world have participated in this growth, but it has been particularly marked in Europe and Europe overseas, especially prior to 1900.

3. Since 1900 the rate of growth has tended to decline in Europe, North America, and Oceania; but in Africa, Asia, and Central and South America there apparently has been some acceleration of the rate of increase.

It will assist the discussion of future trends to examine briefly the processes by which this growth has occurred. The essentials of the story are simple enough. Growth came from the decline of mortality. This decline arose from different sources and occurred in different degrees in various parts of the world. In Europe an era of peace and domestic order began to restore the ravaged continent during the seventeenth century. Then shortly afterward there followed a series of agricultural innovations that greatly increased the food supply, which was further augmented by the vast resources of the New World. Industrial innovations began to bring spectacular increases in product. Finally, sanitary and medical advances brought control over the ravaging diseases of childhood and young adult life. In short, the whole process of modernization in Europe and Europe overseas brought rising levels of living, new controls over disease, and reduced mortality.

Meanwhile, fertility was much less responsive to the processes of modernization. So far as we can tell from available evidence, no substantial part of the modern population growth has come from a rise in fertility. On the other hand, neither did fertility decline with mortality. The reasons why fertility failed to decline with mortality are clear enough in general terms. Any society having to face the heavy mortality characteristic of the premodern era must have high fertility to survive. All such societies are therefore ingeniously arranged to obtain the required births. Their religious doctrines, moral codes, laws, education, community customs, marriage habits, and family organizations are all focused toward maintaining high fertility. These change only gradually and in response to the strongest stimulation. Therefore, mortality declined, but a fertility high enough to permit survival in an earlier period began producing rapid growth.

Eventually fertility also began to decline, the trend in Europe starting in the northwest in the latter part of the nineteenth century. From this focus it moved east and south across the continent, meanwhile having become well established in North America, Australia, and New Zealand.[4]

It is important to understand something of the causes of this trend for, so far as the record goes, these are the only populations that have controlled their fertility sufficiently to bring birth rates into balance with the low death rates that modern conditions permit. They are the only populations that have thus far shown a way by which growth can be checked other than through death, the only ones that have attained high efficiency in the maintenance of the stream of life.

There is abundant evidence that the decline came about primarily through rational control, largely by means of contraceptive practices. It does not follow that contraception can be viewed as the cause of the declining birth rate in any profound sense. Relatively effective methods of contraception were widely known for centuries before they were generally used. Birth rates were reduced largely by means of contraception, but in response to drastic changes in the social and economic setting that radically altered the motives and aims of people with respect to family size.[5]

The catalogue of such changes is large and can be only suggested here. Most of them center around the growing individualism and rising levels of popular aspiration developed in urban industrial living. With the growth of huge and mobile city populations, the individual came to depend less and less on the status of his family for his place among his fellows. The station to which he was born gave place to his accomplishments and possessions as the measure of his importance. Meanwhile, the family lost many of its functions to the factory, the school, and commercial enterprises. All these developments made large families a progressively difficult and expensive undertaking; expensive and difficult for a population increasingly freed

[4] The decline in birth rates began earlier in France and the United States, and perhaps in Scandinavia. In France the secularizing influence of the French Revolution was undoubtedly important. In the United States the birth rate has been dropping since the beginning of the nineteenth century, but the rates have moved down from the exceptionally high levels which characterized a frontier society that was unusually favorable to high fertility.

[5] See Norman E. Himes, *Medical History of Contraception* (Baltimore: Williams & Wilkins Co., 1936); and Regine K. Stix and Frank W. Notestein, *Controlled Fertility* (Baltimore: Williams & Wilkins Co., 1940), chap. xv.

from older taboos and increasingly willing to solve its problems rather than to accept them. In short, under the impact of urban life, the social aim of perpetuating the family gave way progressively to that of promoting the health, education, and material welfare of the individual child; family limitation became widespread; and the end of the period of growth came in sight. However, during that period the population of European extraction had increased nearly seven fold throughout the world.

The more rapid response of mortality than of fertility to the forces of modernization is probably inevitable. The reduction of mortality is a universally acceptable goal and faces no substantial social obstacles. But the reduction of fertility requires a shift in social goals from those directed toward the survival of the group to those directed toward the welfare and development of the individual. This change, both of goals and of the social equipment by which they are achieved, is at best a slow process. As a result, the period of modernization is virtually certain to yield rapid population increase.

By the end of the interwar period, in nearly all the countries of northwestern and central Europe, fertility had fallen substantially below the level required for the permanent maintenance of a stationary population at existing levels of mortality. In the United States, since 1930, it has been at or below the level required for replacement except for the war flurry of the last few years. Australia and New Zealand are in a similar position. In all of these countries growth continues only because of the favorable age distribution of the population, which time will alter. Populations in which fertility has fallen below the replacement level or those in which it is near and rapidly approaching that level may be characterized as those of "incipient decline," our first demographic type.

Other populations are in an earlier stage of demographic evolution. Among them birth and death rates are still high and growth is rapid, but the decline of the birth rate is well established. These we may characterize as in the stage of "transitional growth," the second type. Still other populations have scarcely begun their demographic transition. Mortality is high and variable and is the chief determinant of growth, while fertility is high and thus far has shown no evidence of a downward trend. In these populations rapid growth is to be expected just as soon as technical developments make possible a decline in mortality. We may characterize this type as that of "high growth potential." Our most realistic view of the prospect for future population change can be made by considering the position of each of these demographic types.

TYPE I. INCIPIENT DECLINE

The populations of northwestern, southern, and central Europe, North America, Australia, and New Zealand may all be characterized as those of incipient decline. In the interwar period their fertility was low and declining. In all of them only immigration or the reversal of recent trends in fertility can prevent the virtual termination of growth within a generation. In most of them fertility would have to rise substantially to forestall decline, and such reversals will not be easily obtained, short of drastic governmental policies of an essentially totalitarian kind.

It is not possible to predict the actual course of future population change. However, we can illustrate the implications of the underlying situation by showing the sorts of population that would develop in the absence of fundamental change. Thompson and Whelpton have done so for the United States, and my colleagues and I have done so for Europe and the Soviet Union on certain assumptions.[6] The methods used in the two studies are not entirely comparable, but they are sufficiently so for our purposes. The trends for selected areas are shown in Figure 2, which gives the actual populations from 1900 to 1940 and the projected populations from 1940 to 1970. All of the projections disregard war losses, international migration, and international boundary changes. All of them are based on the general propositions that both fertility and mortality will decline, most rapidly where they are highest and least rapidly where they are lowest, and that the declines will become less rapid as time goes on.

It is apparent from Figure 2 that the population of northwestern and central Europe reaches its maximum by about 1950, even on these assumptions that disregard war losses. The population of the United States, which Thompson and Whelpton have projected on the assumption of a somewhat less rapid decline in fertility than was used for Europe, continues to grow after 1970, but from then on at a very slow rate. The same is true for southern and eastern Europe, but eastern Europe is better characterized as a region of transitional growth than as one of incipient decline. By 1970 the projected growth of southern Europe is negligible. The trend for the Soviet Union, which is in the stage of transitional growth, is also shown, by way of contrast. The projected increase between 1940 and 1970 amounts to 78 million, yielding a total of 251 million by 1970.

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[6] Warren S. Thompson and P. K. Whelpton, *Estimates of Future Population of the United States, 1940–2000* (National Resources Planning Board) (Washington: Government Printing Office, 1943); and Notestein, Taeuber, Kirk, Coale, and Kiser, *The Future Population of Europe and the Soviet Union* (Geneva: League of Nations; New York: Columbia University Press, 1944).

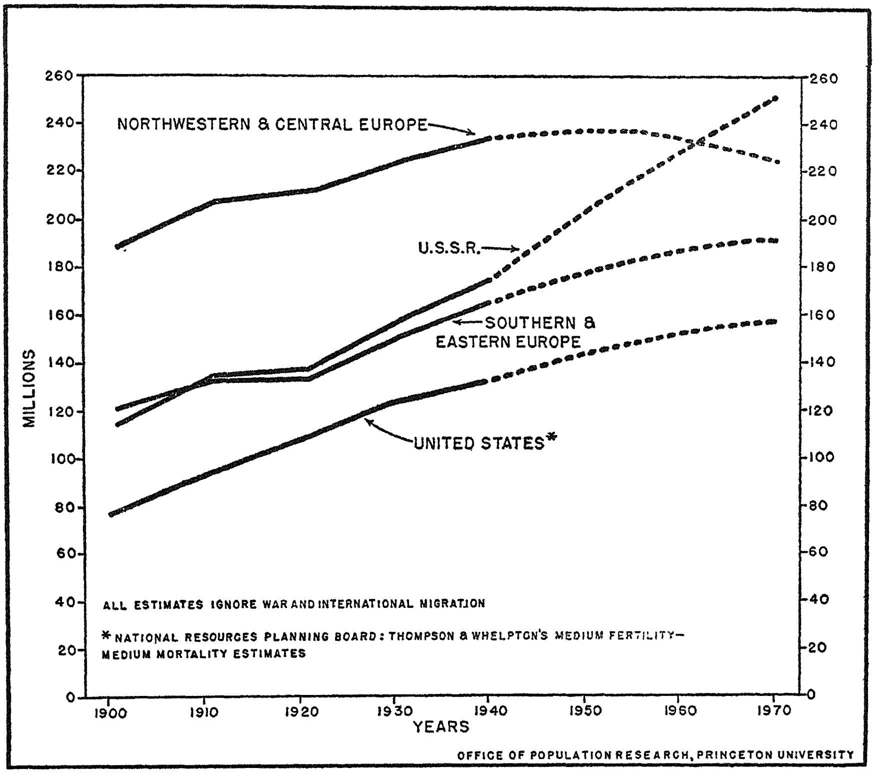

Fig. 2.—Population trends for selected areas, observed 1900–1940, and projected 1940–70 (reprinted from *Population Index*, Vol. X, No. 1 [January, 1944]).

Coming changes in the age distribution of the population will be quite as important as those in total numbers from the point of view of international relations and food requirements. Figure 3 illustrates the types of change that may be expected under the assumptions of our discussion. It permits the comparison of age distributions in 1940 with those projected for 1970 for the United States, northwestern and central Europe, and the Soviet Union, the last being a region of transitional growth. In each of the pyramids males are to the left and females to the right. The length of the bottom bar indicates the

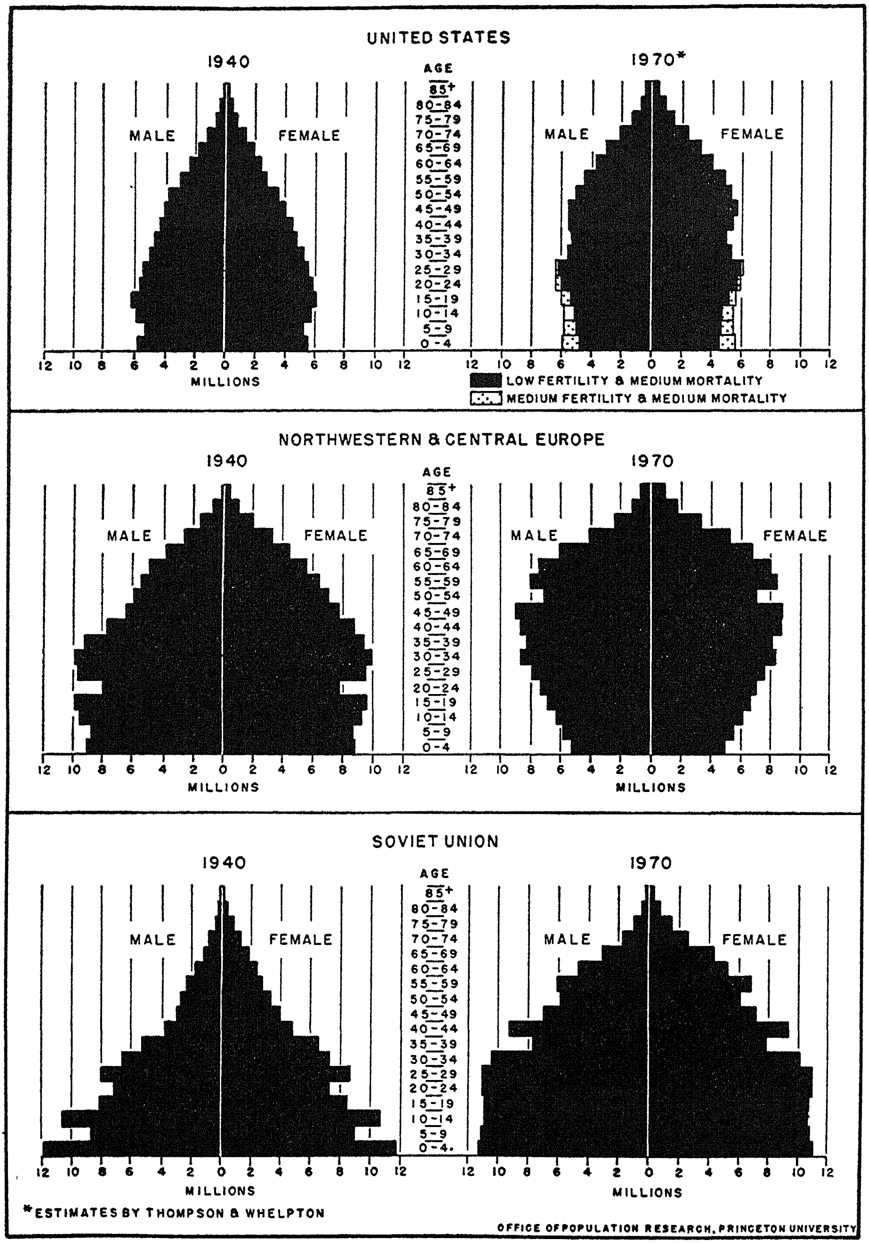

FIG. 3.—Age and sex distribution of the populations of 1940 and of the projected populations of 1970, for the United States, northwestern and central Europe, and the Soviet Union (values for the United States from Thompson and Whelpton, *Estimates of Future Population of the United States, 1940–2000*, pp. 68–69 and 92–94; values for Europe and the Soviet Union from Notestein and Others, *The Future Population of Europe and the Soviet Union*, pp. 242–43, 312–13).

number of persons aged zero to four years; that of the bar next above, the population aged five to nine; and so on to the top bar, which represents the population aged eighty-five years or more.

Much of the demographic history of a population can be read from its pyramid. For example, that for northwestern and central Europe in 1940 is concave on the left at ages forty to fifty-four as a result of the casualties of the first World War. The notches at age twenty to twenty-four are the result of the birth deficits of that war. The maximum age group falls at thirty to thirty-four years. This group was born between 1905 and 1910, the period of the region's maximum number of births. The undercutting of the pyramid at younger ages reflects the shrinking baby crops of subsequent years, a shrinkage that reduced births to their peacetime low in 1930–35. The rise at ages zero to four comes from the larger birth cohort of 1935–39 induced by the pre-war boom and the Nazi pro-natalist policies. This erosion of the pyramid at the younger ages shows clearly why we may expect the death rate to rise and the birth rate to fall in the future. When the relatively large groups now in the childbearing ages move on to swell the deaths at ages of high mortality, they will be replaced in the reproductive ages by the smaller groups now in the years of childhood.

The pyramid to the right shows the type of age distribution that would be expected by 1970 under present assumptions. Losses of the current war and the effects of migration will, of course, alter the details, and governmental efforts to stem the decline in the birth rate may increase the numbers under age twenty. However, unless the pre-war trends are sharply changed, the aging of the population will be very rapid, and in any case a considerable aging is inevitable.

As the pyramid at the top of the chart indicates, the population of the United States in 1940 was further from its maximum. The largest number of births occurred in 1920–24, some fifteen years later than in Europe. The erosion to be anticipated is considerably less severe, although if we accept Thompson and Whelpton's "low" instead of their "medium" assumption on fertility, it is rather marked. In either case, however, the progressive aging and the slowing growth of the population are clear and are characteristic of the type of incipient decline. It is evident that the era of rapid growth is drawing quickly to a close in Europe and North America, except as it may be reinstated by substantial immigration. Australia and New Zealand are in a similar position.

TYPE II. TRANSITIONAL GROWTH

As noted above, the stage of transitional growth is that in which the decline of both fertility and mortality is well established but in which the decline of mortality precedes that of fertility and produces rapid growth. The populations of eastern Europe are nearing the end of this stage; those of the Soviet Union and Japan and of certain Latin-American countries are in mid-course; while those of Turkey, Palestine, and parts of North Africa appear to be entering it.

The age pyramid for the Soviet Union shown in Figure 3 illustrates the growth capacity of this type. That for 1940 is typical. The narrow top and broad base reflect both the high mortality of past years and the fact that, in spite of this mortality, birth rates have been high enough to yield progressively larger numbers of babies. The gashes of the pyramid result from the terrific losses of the war and revolution, and at ages five to nine the effect of the hard years of 1930–34, plus that of the official abortion policy.[7]

The pyramid for 1970 neglects the effect of the present war and is based on the assumption that both mortality and fertility will decline from the high pre-war levels about as rapidly as they have declined from similar levels in other countries. On these assumptions, during the thirty-year period from 1940 to 1970, the increase alone exceeds the total population of Germany, present or prospective. Of course, war losses will cut the growth; if by 28 million, then the increase would still be 50 million. Moreover, on these assumptions, even by 1970 the parental stocks would not be depleted, so that a very considerable capacity for growth would remain.

The position of Japan is particularly noteworthy. Obviously it is futile to speculate on the future size of its population. Growth in Japan will depend almost entirely on the nature of the war losses and on the economic dispositions of the peace. Its congested population, living in a land deficient in natural resources, is clearly at the mercy of postwar economic arrangements. Japan is interesting, not so much for itself, as for the light it sheds on the processes of population change in the Orient. It is the only Eastern nation that has undergone a substantial period of industrialization and urbanization, hence the only one in which the demographic responses to these changes can be contrasted with those of the West.

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[7] The 1940 age distribution is that estimated by Frank Lorimer. The details of his procedure will appear in his forthcoming book prepared for the Office of Population Research, entitled "The Population of the Soviet Union: History and Prospects."

Figure 4 is informative in this particular. It compares the trend in the birth and death rates for Japan from 1921 to 1941 with those for England and Wales from 1881 to 1901. There is a marked similarity between developments in Japan during the interwar decades and those in England forty years earlier. Both the birth and the death rates were about the same height, they were declining at about the same rates, and the amount and trend of the natural increase were

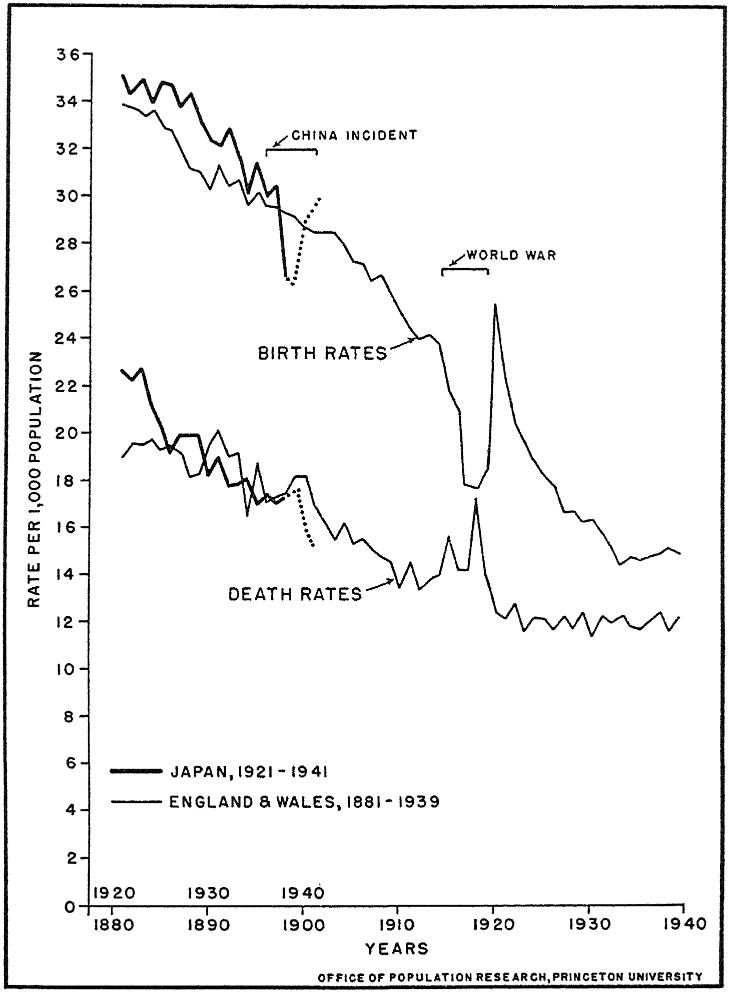

FIG. 4.—Birth and death rates for Japan, 1921–41, and for England and Wales, 1881–1939 (from Kirk, "Population Changes and the Postwar World," *American Sociological Review*, IX, No. 1 [February, 1944], 34).

much the same. Figure 5 shows the marked similarity of the age distribution of Japan in 1935 to that of England and Wales fifty-four years earlier. On the surface, at least, it appears that Japan's response to urbanization and industrialization has been much the same as that of England when similar changes in the setting were under way.[8]

Following rather closely a demographic course analogous to that of the West throughout its modern period, Japan's population has risen from approximately 35 million in 1870 to 73 million in 1940. If it were to continue along the general course of European developments without war losses, its population probably would approximate 95 million by 1970. As a prediction, such a figure is worthless. However, it does illustrate the potentialities for population increase inherent in the transitional stage of growth. Modernization and urbanization in Japan have moved rapidly, but population growth has been of the type that implies a tripling of population in a century, and more than half of that increase would come after the birth rate began to fall. In the century lying fifty years earlier (1821–1921) the population of England and Wales, in fact, did triple, despite substantial emigration. More than half of this increase also occurred after birth rates began to decline. Moreover, since 1921, England has experienced more than twenty years of slowing growth. There is no reason that the writer knows for assuming that other regions can achieve their demographic transition without an analogous period of rapid population increase.

TYPE III. HIGH GROWTH POTENTIAL

More than half of the world's population has not begun its period of transitional growth. Death and birth rates remain close to premodern standards, and birth rates have scarcely begun to decline. Therefore, they may be classified as populations with high growth potentials. Egypt, central Africa, much of the Near East, virtually all of Asia outside the Soviet Union and Japan, the islands of the Pacific and those of the Caribbean, and much of Central and South America fall in this class.

The past trend and present rate of growth of the members of this group are far from homogeneous. In some regions—central Africa and parts of Central and South America, for example—growth has been slow and populations remain sparse. In these instances fertility, even though probably close to the biological maximum, has been sub-

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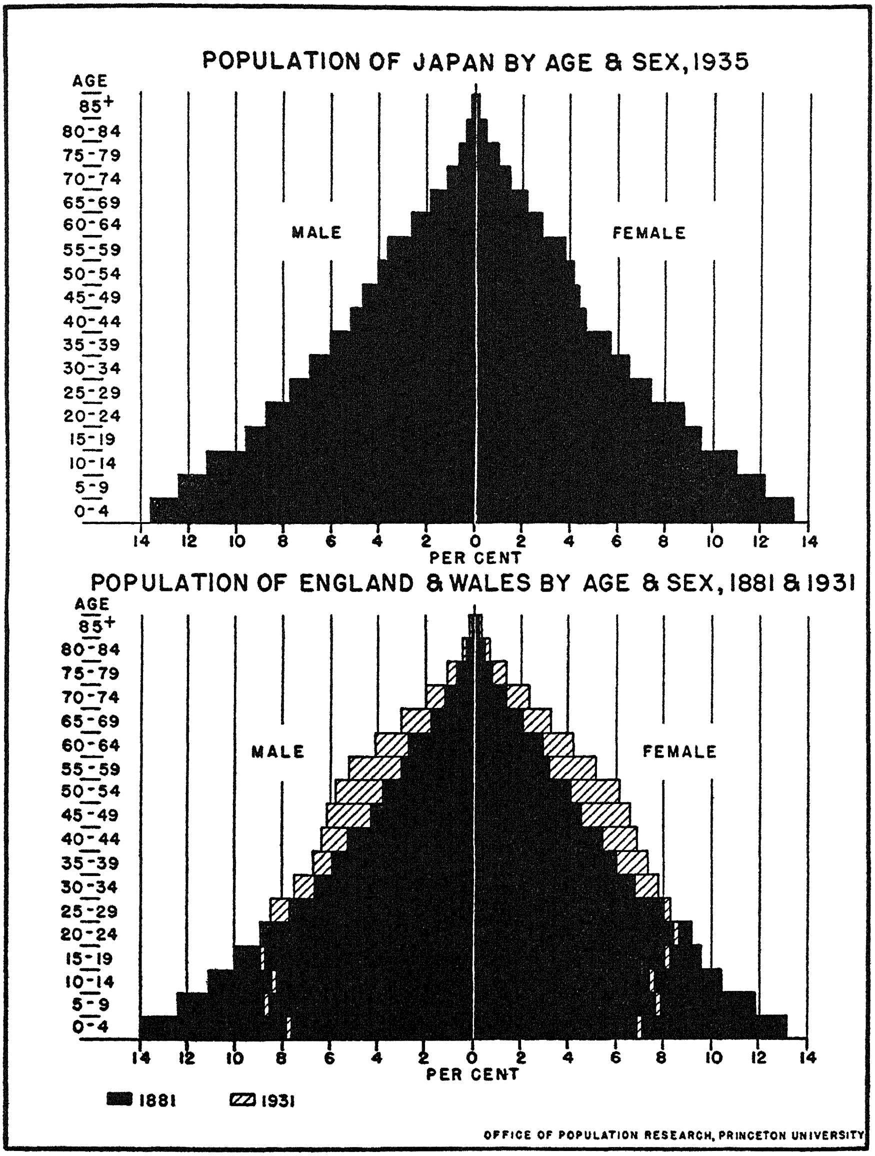
[8] Irene B. Taeuber and Edwin G. Beal, "The Dynamics of Population in Japan," *Milbank Memorial Fund Quarterly*, XXIII, No. 3 (July, 1944), 222–55.



POPULATION OF JAPAN BY AGE & SEX, 1935

POPULATION OF ENGLAND & WALES BY AGE & SEX, 1881 & 1931

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FIG. 5.—Age and sex distribution of the population of Japan, 1935, and of England and Wales, 1881 and 1931.

stantially canceled by extraordinarily high mortality.[9] Such areas of relatively light population and slow growth will become regions of rapid population increase just as soon as mortality is brought under a measure of control. For the immediate future, however, they present no serious problem of population pressure. They are already sparsely peopled, and the same measures that would reduce mortality would greatly increase their carrying capacity.

From the point of view of immediate problems, the situation of the relatively dense populations of this type is vastly more critical. These include such areas as India, Java, Formosa, Korea, China, Egypt, and the Caribbean, all regions with rather highly developed economies of the colonial type. In all of them populations are relatively dense, fertility is high, and mortality is high and variable. The presence or absence of growth depends on the state of political order, the abundance of food, and the incidence of epidemic disease.

India may serve to illustrate the nature of the situation. Its problems, although in many respects the most difficult, are in principle those of the other areas, and its statistical records are superior to those of other areas. Figure 6 traces the course of its total population from 1872 to 1941. It is apparent that, prior to 1921, decades of slow increase, due to famine and epidemic, alternated with decades of rapid growth. The last check to growth came during the decade of the first World War, when the influenza epidemic alone appears to have caused more than 15 million deaths. Since 1920, and for the first time in recorded history, there have been two successive decades of rapid growth. In twenty years the population increased by 83 million. At present it exceeds 400 million and is about as large as that of all Europe west of the Soviet Union.[10]

The factors bringing about this growth are characteristic of this type of demographic situation. Strong government, improved means of communication, increasingly productive agriculture, a little sanitation and epidemic control, have all been essential to the development of the area as a source of specialized raw materials and as markets for manufactured goods. The result has been population growth without substantial increases in the levels of living. Mortality, low enough to permit growth, nevertheless remains high, the expectation of life at birth falling below thirty-five years even in times of relative order and prosperity.

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[9] The reader will understand that throughout most of the areas of this type accurate statistical information is almost nonexistent. Statements made categorically cannot be buttressed by direct evidence. They can, nevertheless, be proved by inference from the general nature of the situation and evidence of the demographic consequences of such situations gathered from the scattered materials that are available.

[10] Kingsley Davis, "Demographic Fact and Policy in India," *Milbank Memorial Fund Quarterly*, XXIII, No. 3 (July, 1944), 256–78.

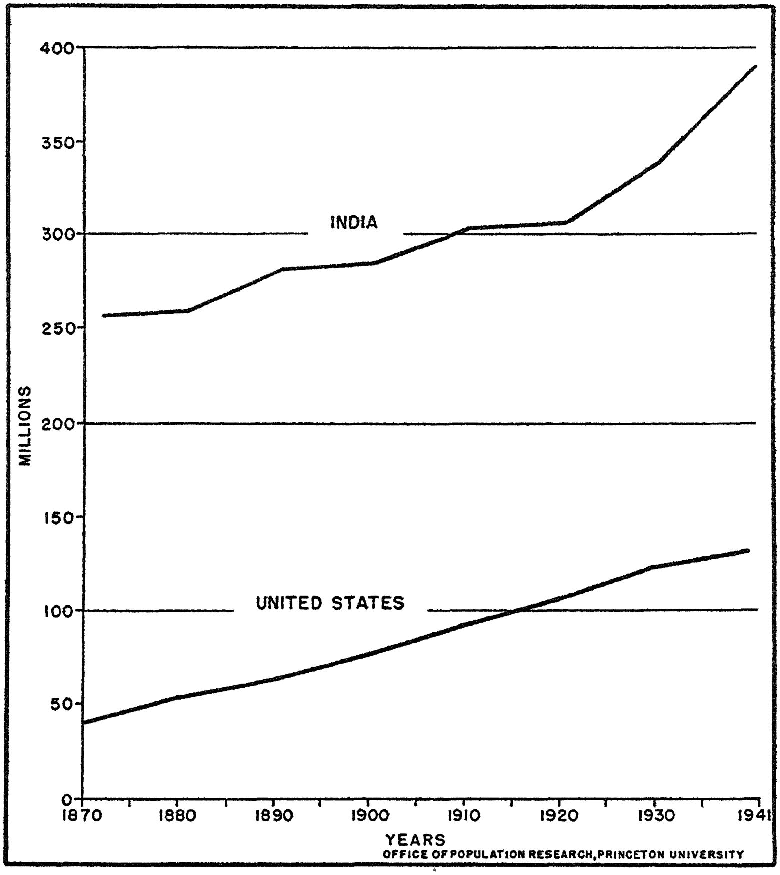

Fig. 6.—The growth of the population of India, 1872–1941, and of the United States, 1870–1940 (from Davis, "Demographic Fact and Policy in India," *Milbank Memorial Fund Quarterly*, XXII, No. 3 [July, 1944], 258).

Meanwhile, the fundamental nature of the agrarian family life, of native customs, religious beliefs, and educational horizons has changed little. The result is that the materials out of which declining fertility grew in the West are not present. In short, the modern nations of the West have imposed on the world's nonindustrial peoples that part of their culture which reduces mortality sufficiently to permit growth, while withholding, or at least failing to foster, those changes in the social setting out of which the reduction of fertility eventually developed in the West. The result is large and congested populations living little above the margin of subsistence.

The future growth of such populations depends almost entirely on events to come. Prolonged periods of political or economic chaos might result in considerable depopulation. On the other hand, a period of peace and order in which there was a rapid advance in production would bring rapid and sustained growth.

Such an epoch of growth could be terminated in two ways. If the essentials of the existing agrarian society are maintained, there is every prospect that growth will continue until the potentialities for increased production are exhausted. Then it will be checked by repeated catastrophes and generally increased mortality. In this case, however, large and poverty-stricken populations would be left with the potentiality for a new cycle of growth any time circumstances permitted.

If, on the other hand, a period of peace, order, and rapidly rising production were to be accompanied by a thorough and balanced modernization, we could expect the same or even faster immediate growth but a different termination. If such developments brought urbanization, industrialization, rising levels of living, popular education, and popular participation in political life, the same forces that eventually induced a declining fertility in the West would probably come into play. The population would then undergo transitional growth, perhaps tripling in the process. If events marched swiftly and studied efforts were made to induce declining fertility, perhaps only a doubling of present populations would be involved.

In sober fact each of these alternatives probably will exist in one place or another. Chaotic political and economic conditions probably will check growth in some areas for a considerable time. In other areas rapid growth will probably be terminated by a series of catastrophes, while fertility remains unchecked. In some instances—many, one hopes—wise and vigorous leadership may bring growth to an end through the reduction of fertility. To be achieved, this last alternative will require a tremendous increase in production, an increase that, in spite of rapid growth, can bring rising levels of living and new vistas of health and individual welfare to the world's most poverty-stricken peoples.

PROSPECTS FOR GROWTH

By way of summarizing this discussion of the prospects for population growth, we may now consider the hypothetical future trends shown in Figures 7 and 8. For the years from 1750 to 1940 they present the same materials as Figure 1, except that Figure 8 shows the population on an arithmetic, instead of a logarithmic, scale. The hypothetical values for the years 1940–2000 are not intended to show what will happen. They are intended to show something of the general nature of the changes to be expected if the conditions assumed actually come about.[11]

For all North America we have assumed that the rates of increase will be those projected by Thompson and Whelpton for the United States on their assumptions of "medium mortality, medium fertility, and no migration."[12] This yielded a maximum value of 176 million for the year 1980. We arbitrarily retained this value for the year 2000 in view of Canada's rather large potentiality for growth. To the writer the figure of 176 million for the year 2000 seems realistic, provided there is no heavy immigration.

In the case of Europe west of the pre-war boundaries of the Soviet Union, we have assumed that the value projected by my colleagues and myself will hold until 1970.[13] On this projection the population was already declining. However, we have held the values constant from 1970 to 2000 and have made no allowance for war losses, on the assumption that there will be effective governmental policies to forestall any sharp decline in population. Under these conditions the population of Europe west of the pre-war Soviet boundaries would be about 417 million by 2000. For the Soviet Union we have accepted our projection of 251 million by 1970. Beyond that date we have assumed a transition of an essentially European type, to obtain a total of 298 million by the year 2000. This figure makes no allowance for war losses. On the other hand, it assumes that fertility, even when it reaches the low levels of western Europe, will drop as it has in western Europe. Whether this course of events comes about will depend on Soviet policy. All things considered, a population in the neighborhood of 300 million by the year 2000 does not seem unlikely. If it reaches that figure, then the population of Europe and the Soviet

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[11] The writer is indebted to his colleague, Dr. Ernest Jurkat, for assistance in the construction of these hypothetical populations.

[12] *Op. cit.*, p. 29.

[13] Notestein and others, *op. cit.*, p. 240.

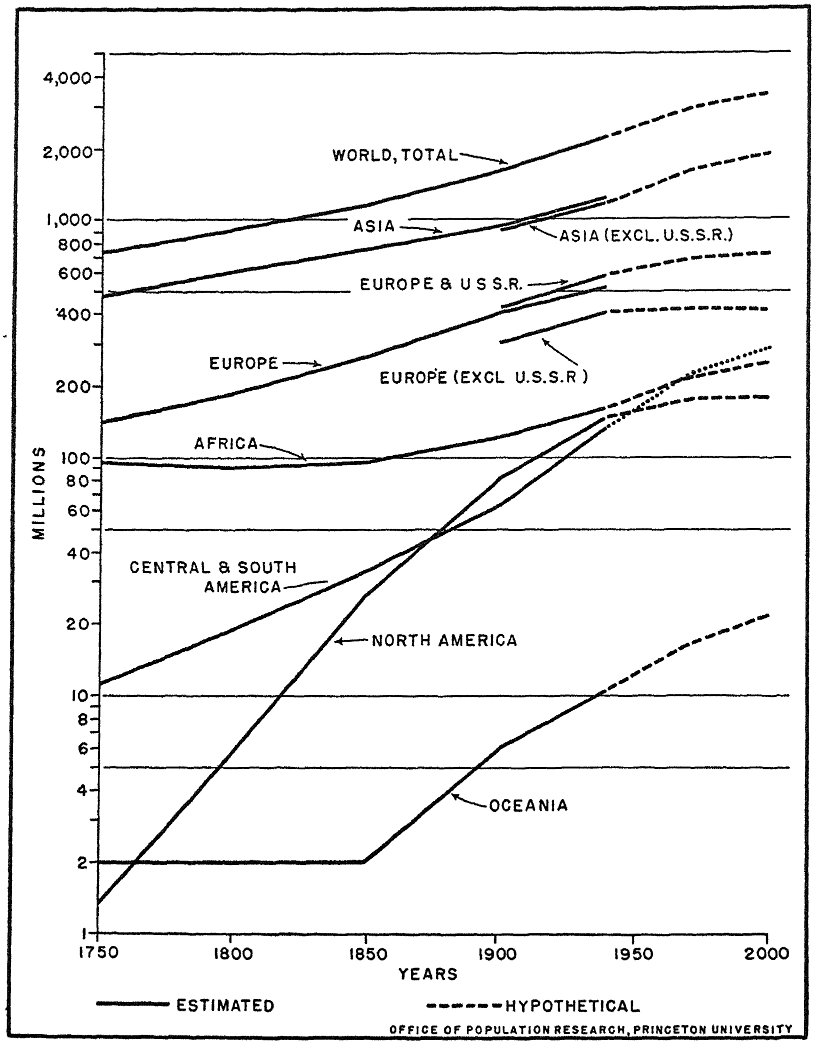

Fig. 7.—Estimated and hypothetical populations of major sections of the world, 1750–2000 (values for 1750–1900 from Carr-Saunders, *World Population*, p. 42; see accompanying text for explanation of hypothetical values).

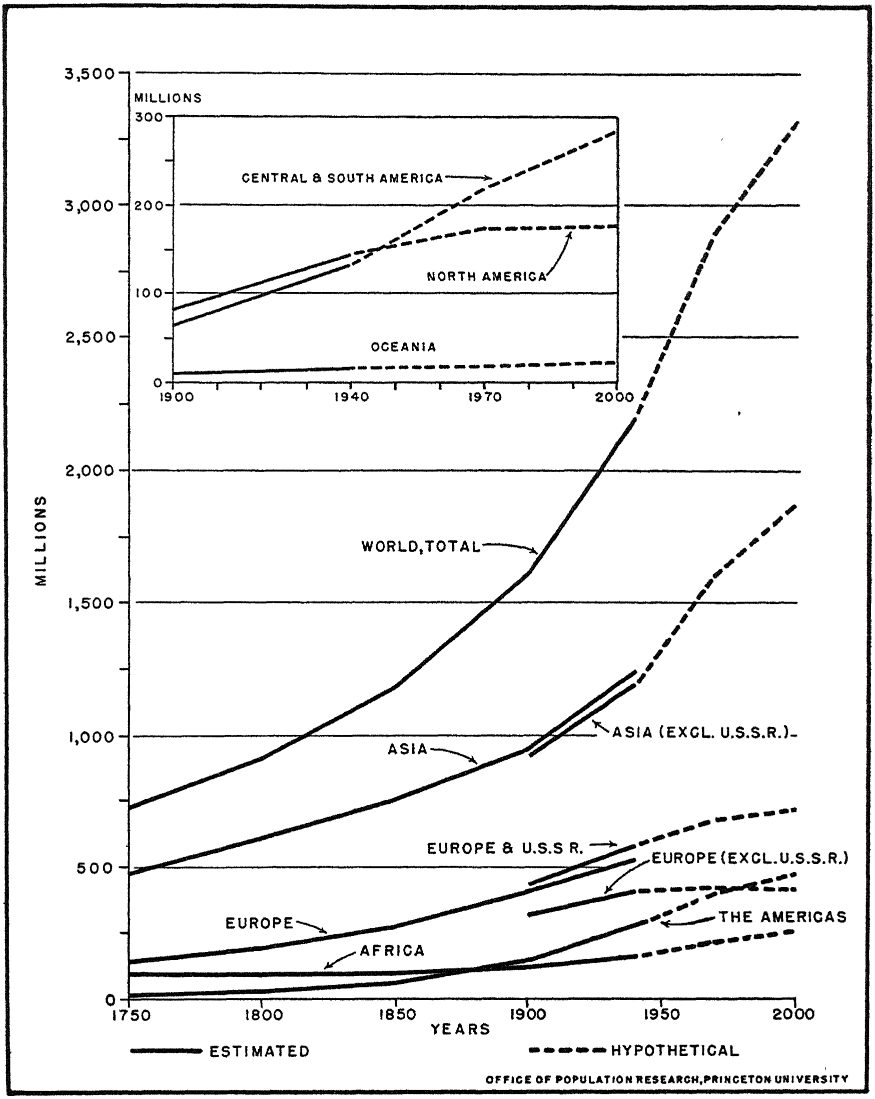

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FIG. 8.—Materials of Figure 7 presented on an arithmetic scale

Union would amount to something of the order of 700 million. Given an era of peace, this, too, seems reasonable.

Now we approach the difficult sections of the world. Central and South America contain populations of two demographic types, and the information available concerning them, even as to their present populations, is highly defective. Less by way of a prediction than as an illustration of the growth implications in a European type of transition from high to low mortality and fertility, we have assumed an essentially European course of events. Having made our best guess at the present birth rate for all Central and South America, we assumed that those rates would decline along a course midway between the past rates of Italy and Germany and that death rates would be those associated with such birth rates in the average of a wide range of experience. These assumptions result in a population of 283 million by 2000, a number a little more than double that for 1940. In view of the possibilities for immigration, this figure seems to be rather conservative.

In the case of Oceania, the principal part of which is Australia and New Zealand, heavy immigration is probable. It is scarcely likely that in the long run they will remain sparsely settled near a teeming East. Therefore, we have assumed increases that give a population of 21 million by 2000, a figure slightly more than twice that of the present population.

There remain Asia and Africa, the most difficult of all. We have, in fact, assumed annual rates of growth of 1 per cent from 1940 to 1970, and of 0.5 per cent from 1970 to the year 2000. Whether the results are too high or too low depends on the course of events. In both continents the rate of 1 per cent represents a slight increase over the estimated prevailing rates, but one that is consonant with the past acceleration. On the other hand, the rate of 0.5 per cent used from 1970 on is lower than any estimated rate of increase as far back as 1850. To the writer the results seem likely to be too low in the case of Africa, where a population of about 250 million is given for the year 2000.

The hypothetical population of 1.9 billion for Asia in the year 2000 also may be lower than events will justify. Of course, it could be too high, but it probably will not be unless there is widespread and prolonged disorder. This contingency, although not unlikely, is scarcely to be counted upon in constructive planning. If, however, we assume a relatively long period of peace and order, then the hypothetical figures for Asia are best justified on either of two rather sharply contrasting assumptions: (1) that the advance in economic productivity will be insufficient to support a more rapid growth or (2) that the advances in economic productivity will be very large indeed and accompanied by rapid modernization and strong policy directed explicitly toward reducing birth rates. Conceivably, such a course of events could hold populations within the hypothetical figure. On the other hand, a rapid increase in production achieved within a slowly changing social framework would probably yield an Asiatic population well over the 2 billion mark by the year 2000.

Summing the hypothetical figures for the year 2000, we have a world total of 3.3 billion people. On the assumption of general order and the spread of modern techniques of production the figure is probably conservative. It implies a slightly accelerated growth between 1940 and 1970, but a sharp curtailment after that date. Given widespread disorder and catastrophe, the reverse of this sequence might develop, with growth slowing in the coming generation, only to rise still higher in the next. However, it appears to the writer that sensible planning for the future should be based on the assumption that the world will have at least 3 billion people by the year 2000.

Finally, in connection with the problems of world food supply, one important fact should be kept in mind. There is a considerable chance that the world will reach the 3 billion level in two generations, with the capacity for growth of its backward populations still unimpaired. If it is not to do so, if by that time fertility is to fall sufficiently to bring in sight the end of the epoch of growth, then advances in production and social political organization will have to be spectacular indeed. Food production will have to increase much more rapidly than population; and equally swift developments must occur in the fields of industrial production, education, public health, and government. For it is only when rising levels of living, improved health, increasing education, and rising hope for the future give new value and dignity to the individual life that old customs break and fertility comes under control. Without such control the growth of the world's population is limited only by its carrying capacity. In the long run it remains true that the control of mortality without the control of fertility is impossible.

POPULATION AS A PROBLEM IN QUALITY

By FRANK LORIMER[1]

THE demographer is frequently confronted with sharp contrasts among nations and regions in levels of production, consumption, health, and welfare that cannot be interpreted purely in terms of the ratio of population to resources, opportunities for trade, or mere exposure to the impact of technological changes in other regions. As examples one might cite the contrast between Scandinavia and the Iberian peninsula, between Japan and southeastern Asia, between the northern and the southern Atlantic states within the United States, or between America north of the Rio Grande and America south of the Panama Canal. It is apparent that social institutions, traditions, and other elusive qualitative conditions are powerful factors in national economy. In the long view these conditions are perhaps even more significant as they affect the dynamics of population.

INTERNATIONAL ASPECTS

In general, widespread poverty is associated with cultural characteristics which both impede rapid increase in the production of goods and services and, granted political stability and a fair measure of modern sanitation, release rapid population increase. Mortality can be greatly reduced by governmental control of water supply and sewage, inocculations, and the distribution of food to areas threatened with famine. None of these measures requires much co-operation on the part of individuals. Further reduction in mortality can be effected by relatively simple changes in ways of living. On the other hand, the control of fertility is dependent on strong personal motivation and involves a profound modification of patterns of behavior. Maximum rates of population growth, therefore, make their appearance when modern methods of political organization and sanitary control are imposed on a people which lacks the social incentives and rational ideology of a technically advanced nation. For example, acceleration of natural increase due to constant fertility and declining mortality during recent decades appears in India, Formosa, Java, the Philippines, and Puerto Rico. The Asiatic mainland as a whole is just entering the era of rapid population increase. Rapid improvement of economic levels and any substantial reduction of fertility are alike dependent on powerful social incentives, individual initiative, and adaptability to new methods of behavior. Programs conceived purely in terms of superficial political changes, improvement in sanitation, and increase in food supply, without reference to changes in less tangible qualitative conditions, may afford some temporary relief but only at the cost of mortgaging the possibilities of orderly progress in the future. In treating world population problems, attention must, therefore, be focused on qualitative conditions, even though this involves problems that are both obscure and loaded with prejudice.

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BASES OF QUALITATIVE DIFFERENCES

The qualitative differences among nations and races have been commonly ascribed to differences in biological heredity. There may be some differences among nations and races in the distribution of genetic factors that are important in health and intelligence; but the whole weight of scientific evidence today indicates that most interpretations of this sort are fallacious and that one should be extremely cautious in resorting to this hypothesis, even tentatively, in any particular case. The popularity of such doctrines rests in part on the psychological tendency for every person to identify himself with a particular group and to overvaluate both himself and the group with which he is identified, but in large part it rests on common sense, involving the simple but inaccurate interpretation of two common phenomena. In the first place, everyone has observed differences in the capacities of persons in similar situations and with similar opportunities. Genetic and psychological research confirms the common observation that such differences among individuals in a constant environment are due in large part—though only in part—to "the stuff that is in them." In the second place, families, communities, and nations show a striking continuity in behavior and attitudes over successive generations, even in very different situations or in the face of many superficial changes. The social scientist can now show how social and psychological mechanisms account for the continuity of culture and the persistence of cultural traits. Lacking this knowledge, common sense supported errors and prejudices which are based on the assumption that qualitative differences among nations and races are identical in their nature with observed differences among individuals in a constant environment.

It is unlikely that the various tribes which encountered each other across Eurasia during many millenniums and which became the progenitors of nine-tenths of the world's population gave rise to nations with very different initial capacities for living. This consideration is less appropriate to stocks long isolated by natural barriers; but the very isolation of these stocks tended to create profound differences in culture. One cannot be dogmatic about the distribution of genetic characteristics in these more isolated races, except to note the wide variation in capacity among individuals in these races and that some individuals in these races are inferior in endowment and some are superior to the average European or Asiatic. Again, any significant genetic differentiation among national stocks since the formation of civilized communities would require a consistent selective process of differential fertility over many generations. No significant trend of this sort can be discovered prior to the beginning of the nineteenth century, except in the ancient centers of European civilization and with the exception of religious celibacy. One must therefore conclude that the conspicuous qualitative differences among nations and races are, in the main, purely institutional and cultural in origin.

CULTURAL FACTORS IN OVERPOPULATION

It is theoretically possible to isolate two very general qualities that have a definite relation to economic and cultural progress and the control of fertility. The first of these qualities, expressed negatively, is frustration, defeatism, demoralization. Expressed positively, it is the sense of ability to cope with situations as they arise, confidence, initiative, morale. A second quality, which is associated with this in complex societies but not necessarily in primitive communities, is adaptability to new types of economic activity, new forms of political action, and new patterns of behavior. At a high level this involves a rational outlook on life and the assimilation of a wide range of human experience, including the results of scientific research.

A widespread and persistent sense of frustration characterizes many peoples. It sometimes finds cultural expression, as in India and among the subject peoples of the Greco-Roman world, in types of religion that emphasize compensation for defeat rather than ways of controlling nature or ways of living. It may also find expression in accentuated personal conflict or excessive use of stimulants or narcotics. The cultural traits associated with frustration are likely to characterize any people whose basic social patterns reflect relations between conquerors and subject peoples or between masters and slaves. On the other hand, a more widespread sense of capacity to cope with problems as they arise is likely to characterize regions long occupied by relatively free peasants, artisans, and merchants or peopled by yeoman pioneers and free immigrants. Demoralization and frustration may also result, especially in the case of more primitive groups, from sudden exposure to new inventions and new situations with which they are not prepared to cope.

In a region characterized by a widespread sense of frustration, progress may come through profound but gradual institutional changes or, as in Russia, through a violent revolutionary process. There is no simple formula for evoking confidence and initiative; but, if such progress is recognized as the *sine qua non* of all other progress, institutional changes can be brought about that will release the springs of new motivation.

NUTRITION AND INITIATIVE

Malnutrition and chronic parasitic diseases may be a primary factor in creating and perpetuating a widespread sense of inadequacy and inertia. Improvement in nutrition may, therefore, be one of the fundamental means of increasing individual initiative. Moreover, if the problem of morale is kept in mind, measures for improving nutrition in backward areas can be so framed as to throw special emphasis on measures that elicit the active participation of the whole population and stimulate higher standards of living, such as improved techniques of production, changes of landownership in the direction of greater democracy, and popular education in scientific principles. In such ways a comprehensive program for the improvement of nutrition in backward areas may promote general economic progress and the control of fertility.

In treating the problem of morale, the appropriate lines of action that would also tend to increase personal adaptability to new conditions and a rational approach to human problems have already been suggested. Large capacity for adaptation to new conditions is becoming increasingly important with the spread of mechanical invention, communication, and more complex types of economic organization. This, of course, points directly toward a major emphasis on the extension of education in all countries and improvements of the quality of education so as to create critical, alert individuals, with capacity for well-informed judgments and co-operative action.

A special problem is presented by the situation of primitive groups, because close-knit primitive societies may be quickly demoralized by rapid, unco-ordinated social changes. Fortunately, areas of primitive culture are generally areas of sparse population, in contrast to the areas of old agrarian civilization. Where a primitive people is necessarily thrust into contact with a more complex society, emphasis may well be placed on the rapid assimilation of individuals as effective members of the larger community. Where there is effective isolation, measures designed to insure the continuity of cultural development would seem to be indicated. The administration of Greenland by the Danish government is especially noteworthy in this connection and merits special consideration. The approach of statesmen to the problems of Africa must be developed with special attention to this problem.

Areas in which there is decline of economic opportunity relative to that in adjacent regions also need special consideration. There is a normal adjustment of population through migration to shifts in relative economic opportunity. Apart from such movements, the situation of the population in these areas would become more and more unfavorable. Out-migration and population decrease may, however, have a depressing effect on the morale, unless economic organization and social institutions are adjusted to maintain the vitality of community life under changed conditions.

The preceding treatment is sketchy, incomplete, and tentative. It is intended simply to draw attention to the critical importance of the problem and to indicate that it has large implications for international policy and regional planning.

NATIONAL POPULATION POLICIES

A new political development originating in Europe raises the issue of population as a problem in quality in an unexpected way. Sporadic, unco-ordinated, and unscientific public measures designed to influence population growth have a long history; but such measures have been notoriously ineffective. Co-ordinated national population policies, formulated with serious attention to scientific findings, are a phenomenon of the last decade, and it is already apparent that such policies can have an appreciable effect on actual population trends. Explicit national population policies, differing widely in objectives and methods, have been adopted in Germany, Italy, France, Belgium, Sweden, Norway, Denmark, the Soviet Union, and Japan and are in process of formulation in Great Britian. The policies of Italy and France were revised shortly before the outbreak of the present war, that of the Soviet Union has been revised during the war, and a Royal Commission on Population has just been appointed in Great Britain.

AIMS AND METHODS

Nationalistic concern about the maintenance or increase of population as it affects the position of any nation vis-à-vis other nations has apparently been a mainspring in the formulation of these population policies. In some cases this has been freely stated; even where officially denied, the popular appeals used to support the program or the type of measures adopted generally reveal its presence. This objective, however, may be pursued either in violation of, or in combination with, interest in the qualitative characteristics of the population. The synthesis of qualitative and quantitative aims is most explicitly developed in the comprehensive plan prepared by the Royal Commission on Population in Sweden and put into effect by the Riksdag. Indifference to the qualitative aspects of population policy is most conspicuous in the Italian and Japanese programs. The programs of most other nations which have adopted comprehensive population policies range somewhere between these two extremes.

The subordination of considerations of quality and welfare to that of numerical increase in the formulation of population policies implies the attempt to stimulate births without regard to effects on the health of the mother, the real level of family living, or the heritage and nurture of children. Specifically, this may be indicated by (1) the suppression of all types of voluntary control of reproduction, (2) propaganda for indefinite increase in number of children, as symbolized by honors bestowed on mothers of enormously large families, (3) incentives, such as birth premiums, designed merely to stimulate births, especially at low economic levels, in contrast to provisions designed to meet the real economic needs of the family with children, and (4) the absence of any provisions for relieving especially handicapped persons of the responsibility of parenthood.

Theoretically, the role of genetic factors in the development of personality might seem to be a central issue in the qualitative phases of national population policy. This is a matter of practical importance with regard to the reproduction of persons from families handicapped by disabling hereditary diseases and with respect to the problem of mental deficiency. These problems, however, relate to a relatively small proportion of any population. Otherwise, as it happens, the theoretical problem of the relative importance of genetic and cultural factors in personality may have no pragmatic significance in population policy. A population policy which includes among its objectives the ideal that the bearing of children should always conform to the real interests of the parents and lays primary emphasis on conditions affecting the nurture of the children is, in effect, a eugenic policy though it may be conceived purely in economic and cultural terms.

Population policies, it is now certain, will become one of the central political issues in many countries in the postwar period. Whether the trend toward population decrease in technically advanced nations will result in a mad "struggle for population" or in liberal policies that embrace the conception of population as a question in policy is a momentous question. The subject merits far more attention than it has yet received.

AN EMERGING AMERICAN PROBLEM

Considerations of population policy have not been brought into the foreground as yet in the United States. A comprehensive population policy as a major phase of governmental action seems remote, though it may not be so far away as superficial observation would seem to indicate. It is probable that in this country population policy will at first enter the scene of action as a secondary consideration for or against specific measures primarily directed toward other objectives. It is easily demonstrated that at any given income level the addition of another child reduces the real income of the parents and of any previous children. Any comprehensive population policy must include measures to remove, at least in part, this handicap to families with children. This may be done either through cash subsidies to families or through subsidy in kind, i.e., the provision without cost, or at reduced cost, of special goods and services. The latter alternative is the one adopted in Swedish policy, and it would appear to serve best the qualitative objectives of a broad population policy. The reasons in support of this judgment are fully presented by Alva Myrdal in *Nation and Family*. One of these reasons is that public expenditure in this way goes directly into building up the health and welfare of the nation. Another reason is that, as a means of making possible larger families, its effect at any given income level is equal or greater among families with high standards of child care, whereas the opposite is true of cash subsidies. In the third place, such a program has educational value in focusing national attention on child welfare and the specific objectives to which such measures are directed, such as nutrition, proper housing, adequate medical care, and education. Finally, a program conceived along these lines eliminates the necessity of any sort of means test in its application, since it constitutes a proper service by the community to families at all income levels.

NUTRITION AND POPULATION POLICY

Nutrition offers the most appropriate field for an initial application of such a policy in the United States. Too many American welfare measures have been hastily conceived to answer some political pressure or to serve some limited objective. It is possible to plan a nutrition program, with special provisions for children and mothers, that will also reduce the economic handicap of families with children and improve the market for agricultural products. The public provision of school lunches and the provision, without cost or at a very low cost, of certain special foods to mothers and children, without a means test of any sort, would serve all these objectives. Financially, such a program is comparable to public provisions for education, and it has comparable justification. Such a proposal would be novel to the American public, but I think it might meet with large popular response. I cannot see that it would encounter any insuperable political obstacles. Certainly the possibility of exploring combinations of population policy, nutrition policy, and agricultural policy seem well worth consideration.

OBSERVATIONS OF PARTICIPANTS

ROBERT F. GRIGGS (National Research Council): The leading assumption of the Hot Springs Conference was that want all over the world could largely be relieved. If better food is provided in countries like India, will not the birth rate rise and take up the slack and India be just as bad off as it is now?

FRANK LORIMER (Foreign Economic Administration): The birth rate would not necessarily rise. But better food might reduce mortality without a change in birth rate and thereby accelerate population growth. That is a real difficulty. A gradual rise in production in India would have just that effect unless in some way there comes a change in the whole institutional structure and culture of the Indian people—all the factors that are essential to any really rapid economic progress and to the control of fertility. It is difficult to conceive of India making this change in culture, which involves a sharp break with its burdensome religion and system of landownership and the inertia of this vast people, without going through some kind of a dynamic upheaval.

FRANK W. NOTESTEIN (Office of Population Research): Western influences have operated in many ways to maintain fertility in India. In some instances the influence has been to undermine existing checks on fertility, as, for example, the opposition to the taboo on widow-remarriage. However, the most important fact is that Western influence has supported and extended an agrarian economy and social organization favorable to high fertility.

One more word on Dr. Griggs's point: The problem of growth is difficult, but I doubt that fertility will decline until the health of the population is improved. Measures to improve nutrition seem to me to be essential for the reduction of fertility. However, they are not sufficient. Until there are more urban centers of industrial development, in which new ideas can yeast and from which they can spread, we cannot expect a substantial decline in fertility.

C. C. COLBY (University of Chicago): Did Mr. Notestein say that the period of rapid increase of population in Asia was just beginning?

MR. NOTESTEIN: Yes, if there is the economic product necessary to support that growth. The decline of the death rate has scarcely started. Life-expectancy at birth in India in good times is about thirty-three years. In China, who knows? The Indian population increased by 83 million between 1921 and 1941 in spite of the fact that probably half of those born died before age twenty-five. In such a situation relatively simple improvements in epidemic control and nutrition would induce rapid growth. The social obstacles to reduced mortality are relatively few; all societies agree that it is good to stay alive. It is not generally agreed that a small family is better than a large one, and the reversal of social goals relating to family size takes a long time. Populations with high vital rates grow rapidly if the external situation permits a decline in mortality. India's and China's situations are not unique. During the three-century period of their vital transition, European peoples increased perhaps seven fold.

MR. COLBY: Neither China nor India nor any other part of Asia has the fundamental resources to warrant increased population.

MR. NOTESTEIN: Support at present levels of living? Certainly China has by no means exhausted its capacity to produce, given a strong government and a period of developing agricultural techniques.

JOHN D. BLACK (Harvard University): The Japanese are producing about twice as much food per acre as China, and the Chinese about twice as much food per acre as India.

JOHN B. CANNING (War Food Administration): The studies of Bennett and Wickizer in their *Rice Economy of Monsoon Asia* make it quite clear that the rice yields grown outside of that area are greatly superior to the yields in monsoon Asia, and the differences are chiefly due to the superiority of cultivation elsewhere.

MR. NOTESTEIN: Leave aside their capacity to produce food. If you ever want to bring that cycle of population growth to an end, if the growth capacity of the population is ever to be checked, it can be done only by setting up those conditions out of which ultimately you get a decline in the birth rate, but these conditions are not found in low levels of living.

MR. LORIMER: The fertility in Russia dropped very drastically from about 1925 to 1935 with no great improvement in the nutrition of the Russian people. Although improved nutrition may be a factor in initiative, institutional changes affecting outlook on life provide the primary motivation for changes in fertility.

THEODORE W. SCHULTZ (University of Chicago): Twenty-five years from today, would you add a fourth demographic type, namely, "depopulation," along with your incipient decline, transitional growth, and high growth potential, and would it not become in western Europe and this country the most discussed critical social problem?

MR. NOTESTEIN: Yes, but fifty years from now the type might have disappeared. Probably not all declines in Europe can be forestalled because the age distributions are unfavorable to growth. However, much will depend on governmental policy. If public alarm about depopulation brings very vigorous policy, it is possible that there will be few actual declines. My guess, however, is that twenty-five years from now the populations of some countries may be slightly below their maximum.

MR. BLACK: What about France as a case study in the last twenty-five years?

MR. NOTESTEIN: France had higher fertility than several countries. Its gross reproduction rate exceeded the rates of, among others, England, Switzerland, Sweden, and pre-Hitler Germany. Its crude birth rate was among the lowest because its population was old, thanks to low fertility since 1890. In the last half of the thirties deaths exceeded births. Popular concern was evidenced by active pro-natalist propaganda and sweeping social-economic legislation designed to increase the size of family. I would expect strong policies to forestall rapid and prolonged decline.

The aging of population causes as much public concern as the threat of dwindling numbers. For example: If the age schedules of fertility and mortality were to remain unchanged at their pre-war levels in Sweden and there were no migration, eventually there would be more females at fifty-five than at any other age. Infant girls would be no more numerous than women aged seventy-four. This is not a prediction, it is just arithmetic. Such facts lead Professor Myrdal to suggest that major postwar political issues will center around problems of population policy (Gunnar Myrdal, *Population: A Problem for Democracy* [Cambridge: Harvard University Press, 1940]).

MR. CANNING: Is there anywhere in history any record in which conscious effort was made of the type it takes for governmental action really to stimulate the birth rate?

MR. NOTESTEIN: No. I doubt that the records of ancient times are pertinent to the present problem. Germany achieved a measure of success, but in doing so drew on nonrepeating sources. Whether its success would have continued another five years is unknown.

P. LAMARTINE YATES (United Nations Interim Commission on

Food and Agriculture): Getting back to the Swedes and people who have worried about the problem of quality, are not any successes in a quality program going to make it much harder when it comes to the quantity of 1970 or whatever the date is?

MR. LORIMER: It is much easier to put into effect a program which has no regard for qualitative considerations, in which you trap your more ignorant and handicapped people into having children. What the Swedes are trying to do is to hold up the numbers without the sacrifice of quality and, in fact, positively improve the welfare of the population through a whole battery of very complex measures, placing a higher valuation on children in the culture, attempting to reduce the economic difference between families that have children and those that do not. It is a much more difficult thing to do. I don't think it is impossible.

MR. SCHULTZ: From the standpoint of the demographic classification employed by Mr. Notestein and with Mr. Colby's question of pressuring people on resources in mind, it seems that Type 1 is dismissed, in the sense that there may actually be declining pressures on food resources; Type 3, which is essentially pretransitional, is held there by actual lack of food. Food-producing resources now establish the upper limit to population.

In Type 2, with its transitional growth the expansion in population may put severe claims on agricultural resources. To study this type we should not look at China and India but at some of the major countries that in our lifetime have gone from Type 3 to Type 2 and see what happened.

Suppose we had discussed Russia from this viewpoint twenty-five years ago. Now Russia is really in Type 2, transitional growth, and we ought to ask ourselves whether or not it is possible for the Russians, inside the Russian orbit, to double their population and provide enough food from Russia's resources? Does anyone believe that the Russian resources will not be able to carry the prospective increase in the U.S.S.R. population? Every indication is, as Russia applied modern technology, that she can well support the much larger population in prospect for that country.

PART III

NUTRITION

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ADVANCES IN NUTRITIONAL RESEARCH AND WELFARE

By C. A. Elvehjem[1]

RESEARCH is recognized today as one of the most essential functions of organized society, and, of all the fields of endeavor, nutritional research has yielded and will continue to yield excellent dividends. The significance of increased knowledge regarding nutrition is widely recognized by medicine, agriculture, industry, and the public in general. In 1939 Dr. Fishbein[2] stated: "The achievements in the science of nutrition which have developed in recent years are among the most significant of all that have been made in modern medical science." In 1943 Dr. McLester[3] continued: "The most fertile field in the world of medical research today is nutrition." There is the record of the United Nations Conference on Food and Agriculture. Dr. Boudreau[4] has pointed out that, "in contrast to 1918, when international relations were thought of mainly in political terms, the Hot Springs Conference dealt technically with food, nutrition, and agriculture, subjects of vital interest to men and women throughout the world." Nutrition has become of age, interesting laboratory experiments are no longer sufficient, the facts must be built into world patterns.

WHY INTEREST IN NUTRITION MAY WANE

It is not my purpose to emphasize the great achievements that have been made, to make an E award to nutrition, but rather to make sure that similar statements will be made about nutrition, five, ten, yes, even one hundred years from now. It may be well to start on a pessimistic note. There are certain indications which suggest that interest in nutrition is beginning to wane. This may be due to several reasons. I shall try to list a few of them and then suggest what can be done to insure a continuing enthusiasm for this very important field.

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[1] Professor and chairman of the Department of Biochemistry, University of Wisconsin.

[2] M. Fishbein, *The Vitamins* (Chicago: American Medical Association, 1939).

[3] J. S. McLester, *Handbook of Nutrition* (Chicago: American Medical Association, 1943).

[4] F. G. Boudreau, *Nutrition Reviews*, I (1943), 321.

1. The tempo of the advances has been so rapid during the past few years that the public continues to expect still greater contributions. In college, students begin to clamor for another championship team as soon as a successful season is concluded. In many areas the present generation has seen the complete disappearance of rickets, beriberi, and pellagra as a result of the proper application of scientific knowledge. Spies, for example, has reported that hundreds of pellagrins have been treated in the last seven years without a single death. People familiar with these results now expect their arthritis, colds, allergy, etc., to be treated with the same rapidity. Since this is not possible, they begin to grumble a little about the value of nutritional research.

2. Today there is more and more interest in producing optimum health rather than in only preventing obvious disease. The early workers were motivated by the single purpose of alleviating human suffering. Goldberger wrote in a personal letter, December 13, 1915: "I can hardly describe the feeling that I experience as I go through our wards at the asylum and see the poor insane women who a year ago had pellagra but who this year are perfectly well—so far as pellagra is concerned." However, in 1943 Wilder[5] concluded: "We constantly are reminded of the rising incidence of what are called degenerative diseases, and almost every day are shocked to learn of someone, well known to us, who has died abruptly in middle age at the height of his productiveness. I find it impossible to avoid concluding that minor deviation from what has been called a satisfactory intake of one or another of the several essential nutrients plays a part of great importance in the picture of poor health. I therefore regard the next great responsibility of our profession to be extension of the concept of disease prevention to poor health prevention"—a much more difficult task; but it is true that the less obvious deficiencies may be a greater handicap to national and international progress than the severe deficiencies. Failure to treat individuals with these conditions may cause more criticism than failure to treat a pellagrin who does not have sufficient energy to be critical.

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[5] R. M. Wilder, *Proc. Inst. Med. of Chicago*, Vol. XV, No. 1 (January 15, 1944).

3. Sufficient information is now available to allow many individuals to assume that nutrition can be placed on a truly quantitative basis. It is always easier to find errors when specific figures are used. When two different investigators do not find the same thiamine requirement expressed to the second decimal place, even if the experiments were conducted under different conditions and with subjects of different ages, many immediately conclude that there must be something completely erroneous about our knowledge of this nutrient as well as all related factors. We should all realize that a few figures are dangerous and that variations will continue to be observed until all conditions are adequately controlled. Similarly, if values taken from a table of food composition indicate that a diet meets the accepted quantitative requirements and the individual consuming this diet does not feel well, then there must be something fundamentally wrong with scientific nutrition. It is so easy to assume that all nutritional factors can now be measured quantitatively.

4. Many of the nutrients are now available in pure form in sufficient quantities and at a reasonable price so that they may be used extensively in clinical research. The routine cases of anemia treated with iron and copper or the scurvy responding to vitamin C are soon forgotten, but the resistant cases are the ones that remain in the minds of the clinician. One may be enthusiastic about nutrition if he is rather certain that the condition encountered will respond to thiamine; but when thiamine was not available the possibility could not be established one way or the other. Today the question can readily be answered; but if negative results are obtained, it is much easier to conclude that nutrition is not so important as first assumed than it is to look for other nutritional relationships. Let me outline what might happen to an individual today who is troubled with so-called nervous fatigue. Large doses of niacin and thiamine were found to be ineffective. Daily injections of 100 mg. of pyridoxine increased the fatigue and caused diarrhea. On a reduced dosage the patient gained weight. At the same time, 25,000–50,000 I.U. of vitamin A were given to clear up the scaliness of the skin. Later it became necessary to discontinue pyridoxine therapy entirely. Doses of riboflavin up to 40 mg. per day were without effect except to upset the patient's sleep. Pantothenic acid had certain harmful effects. Finally, natural B complex preparations were given, and they seemed to give definite beneficial effects. Fortunately, the patient felt that some improve-

ment was finally achieved; however, it is easy to see how both doctor and patient might have become discouraged much earlier.

5. In spite of continual emphasis on the importance of nutrition in increasing resistance to infection, very few definite relationships have been established, and there appears to be no hope for any significant development in the very near future. Nutritionists enjoy retelling the story of Eijkman and others, who believed that beriberi was due to an infection and who were finally forced to conclude that the disease was a nutritional deficiency. The earlier ideas were not surprising, since at the end of the past century Pasteur had shown that epidemic diseases were usually caused by microörganisms and that therefore every disease must have its positive causative agent. There are those who are most willing to remind nutritionists today that many diseases are still the result of infection. Furthermore, there are results that indicate that a reduced intake of certain nutrients increases rather than decreases the resistance of an experimental animal to infection. The Wisconsin group has produced as much evidence in this direction as any other group. For example, mice deficient in thiamine[6] are definitely more resistant to both Theiler's encephalomyelitis virus and the Lansing strain of poliomyelitis virus than mice receiving optimum or excessive amounts of thiamine. To date no such clear-cut results have been obtained in monkeys deficient in thiamine. Riboflavin-deficient mice show a reduced incidence only in the case of the Lansing strain, while pantothenic acid-deficient[7] mice show a greater resistance only to Theiler's virus. These results do not discourage me either from the scientific or from the practical point of view. They do show that it is possible to influence susceptibility through diet but that infinitely more work is needed before any generalizations can be made. Dr. Schneider of the Rockefeller Institute, who is studying this problem under carefully controlled genetic conditions, has made the best statement, namely: "There is a relationship between nutrition and resistance to infection but none of the known factors are involved." We must also recognize in this connection the successful use of sulfa drugs and penicillin in infectious diseases and the psychological effect of these highly successful results on the public. Those who have talked most en-

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[6] A. F. Rasmussen, Jr., H. A. Waisman, C. A. Elvehjem, and P. F. Clark, *Jour. Infect. Dis.*, LXXIV (1944), 41.

[7] H. C. Lichtstein, H. A. Waisman, C. A. Elvehjem, and P. F. Clark, *Proc. Soc. Exper. Biol. and Med.*, LVI (1944), 3.

thusiastically about nutrition will now undoubtedly give greatest praise to these newer findings.

6. We have with us continuously the pernicious type of commercial advertising and statements and articles by psuedo-nutritionists. I imagine more people have lost faith in nutrition from listening to the radio than from any one of the other causes. Writers who are interested in advancing the interest in nutrition often discourage their readers because of frequent errors and contradictions in their articles.

7. Finally, the war emergency has produced some discouraging notes. In some areas the problems are so immense, so complex, and so urgent that any attempt to apply scientific knowledge seems almost hopeless. In some cases the results appear to be meager in terms of the effort expended, although the favorable accounts on the state of nutrition in England during the period of severe food restriction are certainly most encouraging. The low incidence of classic deficiency diseases in areas where the food has been very limited has also tended to shake the enthusiasm of some of the workers. However, those who have worked with animals know that gross symptoms seldom appear unless the diet is inadequate in only one nutrient. Nevertheless, the animals maintained on diets low in several factors for long periods of time often showed the most severe metabolic disturbances.

ATTAINING FURTHER PROGRESS IN NUTRITIONAL RESEARCH

These criticisms are minor in contrast to the highly successful programs which have been carried out during the past few years, and they will remain minor if we try to overcome them as they arise. Criticism is healthy if we give proper recognition to it.

What can we do to continue to make nutrition the most fertile field of medical research? We need research, more research, and still more research and then a common-sense point of view about the application of the results. We must continue all phases of experimental work as fast as we can because no one knows which advances will have the most important applications. Like most research, the nutritional work carried out in the past has not always been directed at the solution of specific human problems. During the early period it was fortunate that animal husbandrymen were interested in improving the nutrition of their animals. Thus studies on the prevention of leg weakness in chickens helped to find methods of preventing rickets in children. It was fortunate for American children that this finding came at a time when more and more children were being deprived of adequate exposure to sunlight because of a greater concen tration of families in industrial centers. It was fortunate that more was learned about vitamin C about the same time that pasteurization of milk was introduced, a process of great importance for the protection of the child against infection but one which tended to reduce the vitamin C intake.

FORTIFICATION PROGRAMS

Perhaps the best we can do in the field of nutrition is to keep pace with the developments in related fields which directly or indirectly affect health. Some may say that we even failed to do this in the case of refined cereals. Mendel, McCollum, Sherman, and others gave us a fair warning, although methods may not have been available for carrying out any extensive program for counteracting the loss of nutrients during the processing of the cereals. Again it was fortunate that, when an active program was most urgently needed, several developments had proceeded to the point where they could be integrated into one unified effort. In the first place, the two vitamins lost to the largest extent during the milling of wheat were the cheapest of the vitamins available in synthetic form. Second, methods for measuring these and related vitamins had been perfected, so that the exact distribution of these nutrients in the different parts of the kernel could be determined. Third, the milling and baking industries were ready to co-operate to the utmost and gave time and money to carry out the practical phase of fortification.

Regardless of all other benefits of the fortification program, one effect will always stand out, namely, the stimulation of interest in the assay of all types of foods. To be sure, the meat industry, together with the fruit and milk industry, had given considerable attention to the estimation of the vitamins and minerals in their products, but all work was greatly expanded after the fortification program. Army rations and dehydrated and processed foods of all kinds were carefully analyzed for the most important nutrients. Even proximate analyses were made on many food products that had been neglected during the vitamin period. From these data a practical nutrition program was constructed.

THE VALUE OF SYNTHETIC VITAMINS IN RESEARCH

Many of these practical problems taxed our ability to the limit, and some of us began to believe that the application of the results of nutritional research was the most difficult problem. However, the applications had been delayed, and with the war emergency many divergent problems had to be considered at one time. I believe that we have now reached the point where fundamental research again becomes the limiting factor in further progress. One of the developments which allowed more rapid application of scientific knowledge was the availability of synthetic vitamins at greatly reduced cost. In this connection we should not overlook the tremendous value of these pure substances in animal research. Animal studies can now be placed upon a systematic basis; we can study the effect of the lack of each factor and be certain that all the others are present in adequate amounts. Other advances allow a more complete study of the tissue and enzyme changes and the interrelationship between one vitamin and another. For example, recent work has shown that young rats depleted of thiamine show an increased riboflavin content of the livers and an increased content of thiamine when the riboflavin is withheld.

This does not mean that progress will necessarily be more rapid, but it will certainly be more thorough. Small effects can be observed which were completely overlooked previously. There will be great need to continue the use of a variety of experimental animals and probably an expansion to species that have never been used before. This does not mean less work with humans; in fact we need more studies to establish the final facts. However, the exploratory work must be done with animals, or otherwise the work will become too expensive and too objectionable. For example, many workers have striven for years to find a reliable laboratory animal for the systematic study of dental caries. Two years ago Dr. King urged our laboratory to accept a grant from the Nutrition Foundation to study dental caries in the monkey because we had had some experience with this animal and because the results might be more directly applicable to the human. Progress was very slow because it took many months for the caries to develop in this animal, but a year ago we found that the cotton rat, placed on a synthetic diet, developed in a period of fourteen weeks exceedingly severe caries. Little or no caries developed when the sucrose was replaced by dextrin or when the natural diet was used. The carbohydrate relationship in this work is most interesting and must be followed much further, but preliminary results also indicate that fluorine has a protective effect. I would be the last to conclude that any of these results can be applied directly to the human, but I do believe that more rapid and more accurate progress can be made by working out the fluorine relationship in this animal before attempting some of the large-scale human experiments which have been proposed.

When nutritional laboratories can return to normal work and the problems can be attacked from a great many approaches, we shall see results which will make the tempo of past advances seem like the horse-and-buggy days. The most encouraging note for future development is the willingness of many groups to support fundamental research. The funds and equipment are available, personnel will, of course, be short until after the war, but then the only limiting factor will be our ability to plan and execute the work.

How should this work proceed? Most individuals interested in good nutrition may not be directly concerned with the technical aspects of nutritional research. This sphere is nevertheless important, and I propose to discuss my ideas so that those interested in international food problems may be more able to keep the laboratory man on the right track than those who work only within the four walls of a laboratory.

THE NEED FOR CONTINUOUS RESEARCH

One of the best examples of continuous research is the work on amino acids by Rose. It is true that much of his present work could not proceed if great advances had not been made in the field of vitamins or in the chemistry of amino acids, but he refused to be diverted from his main problem and continued his studies so as to be ready to apply the advances from other fields as soon as they were available. As a result he has been able to establish the human requirements for amino acids more rapidly than other workers were able to do for vitamins.

As another example, I should like to describe very briefly the developments in a much less important phase of nutrition which workers at Wisconsin have been interested in during the last sixteen years. In 1928 we showed that the anemia produced in young growing animals maintained on a milk diet beyond the normal nursing period could be cured or prevented through the addition of simple iron and copper salts. This observation has been important in the present program of restoring refined cereals to whole-grain levels, because cereals are important supplements to milk in the diet of infants. At that time we were interested only in preventing the anemia; but, as the growth and development of the animals were followed further, it soon became obvious that milk when used as the sole article of diet was also low in manganese. When manganese was added in addition to iron and copper to whole cow's milk, young animals, such as the rat, the dog, and the pig, grew at a rate comparable in every way with that obtained on a diet of mixed foodstuffs. In most cases normal reproduction occurred, and second and third generations could be obtained with little difficulty.

This was the first time that animals had been carried through growth and reproduction on a milk diet in spite of the general recognition of the high nutritional value of milk. This merely indicates that one limiting factor determines the success or failure of a diet. It is most interesting that chicks will not grow or survive on mineralized milk, owing to the fact that milk is low in one or more of the essential chick factors which we are now actively studying. Using rats, we found that somewhat slower rates of growth resulted when the milk was produced by cows given dry feed than when the milk was obtained from cows on pasture. Even greater differences were obtained with guinea pigs, and this has led to very extensive studies on the so-called guinea-pig factors. We will know much more about total nutrition when we have a complete understanding of guinea-pig nutrition, and we are trying to carry some of this work in spite of greatly curtailed personnel. We must remember that it was the guinea pig which gave us all the early information about vitamin C.

Many people have wondered why milk carries such large quantities of lactose while practically all other foods are devoid of this sugar. Since lactose is made up of glucose and galactose, the problem is largely one of galactose metabolism. A mineralized milk diet therefore gave us an opportunity to study this problem. It was soon found that on whole-milk diets the galactose ingested as lactose was completely metabolized. However, if the fat was removed from the milk, galactose could be detected in the urine after only a few days. As high as 35 per cent of the ingested galactose was recovered in the urine. When fat was returned to the diet at the usual level, the metabolism of galactose returned to normal. Furthermore, it was shown that all natural fats, as well as palmitic and oleic acids fed in 3–4 per cent of the liquid milk, prevented the galactose loss. Thus the level of fat in milk is an important factor, and nature intended that lactose and fat should be consumed in a relationship similar to that found in milk.

During these studies it was observed that the animals receiving the milk reconstituted with butter fat grew slightly better and appeared in a better state of health than those animals receiving milk reconstituted with certain vegetable fats. These results were also obtained when ample amounts of all the fat-soluble vitamins were added. This immediately raised an important question as to the relative value of animal and vegetable fats aside from the variations in vitamin content generally recognized.

Some have accused us of initiating these experiments for the specific purpose of demonstrating the superior value of butter fat. I believe it is obvious that the observations which we have reported are the results of experiments that have been continued for many years and that these experiments are being continued in order to establish more clearly the relationship of all nutrients in optimum nutrition.

When these studies were started, it was impossible to construct a completely synthetic diet which would maintain an animal for any length of time. However, with the availability of a larger number of vitamins, we were able to change from a skim-milk basal to a purified ration in which the level and kind of carbohydrate were easily altered. The ration which we used extensively contains 28 per cent fat, 48 per cent carbohydrate, 20 per cent casein, and 4 per cent salts. On such a diet, with lactose as the carbohydrate, definite differences in the rate of growth are obtained when butter fat and corn oil are used as the fat. These differences are also evident when sucrose is used but not when dextrin or dextromaltose are used. The differences with lactose and sucrose are much more evident when the intake of B vitamins is reduced than when high levels are used. Preliminary results indicate that these differences can be explained on the basis of variations in intestinal synthesis.

Previously, we had approached the problem of intestinal synthesis only through the use of sulfa drugs, which had been criticized on the basis that these drugs established artificial conditions. However, these results show that fat, carbohydrates, and vitamins are all interrelated in their effect on the production of still unknown factors. There are numerous practical applications, but it is too early to generalize to any extent. For example, this might explain some of the ill effects of large intakes of rather readily available carbohydrates, as used in the areas where pellagra is prevalent. In these areas the condition is further aggravated by relatively high fat intakes, although much of the fat is of animal origin.

Furthermore, we have shown in other studies with dogs that a low nicotinic acid intake decreases the synthesis of folic acid, and folic acid is probably one of the factors concerned in the fat studies. Thus the low nicotinic acid intakes may produce other secondary deficiencies. It is also interesting that Holt and his co-workers have described considerable synthesis of thiamine and riboflavin in humans receiving purified diets containing dextromaltose and that the degree of synthesis is much lower when other carbohydrates are used.

These few observations clearly indicate the need of continuous research. Often very interesting preliminary results lead to erroneous generalizations unless the entire picture is clear. This does not mean that we should disregard clearly established facts or methods because we are unable to correlate them with observations in the field. Some workers are tempted to disregard all the facts. The nicotinic acid content of milk can be used as a good example. Some would have us believe that the nicotinic acid assays are completely erroneous because milk has been found to contain only 1 mg. per quart, and yet Goldberger and his co-workers found it to be valuable in counteracting pellagra. There can be no question about the nicotinic acid assays, since the methods for nicotinic acid are probably as reliable as those for any other of the vitamins. I am more inclined to believe that the entire picture is related to folic acid and that milk stimulates the production of this vitamin even though it is low in nicotinic acid. Furthermore, some of the symptoms associated with pellagra are related to folic acid deficiencies as well as to a nicotinic acid deficiency. When we know the entire story, we shall find again that nature has a definite reason for producing a food for young which is high in lactose and low in nicotinic acid and folic acid.

THE NEED FOR TOTAL NUTRITION RESEARCH

Recent statements made by Dr. Keys are impressive concerning the work in his laboratory on the total-approach method in which the total fitness and efficiency of an individual are followed. It is impossible to develop an individual beyond the architecture outlined in his genes, but it is possible to improve the efficiency of his structure through optimum nutrition. The speeding-up of growth or performance for short periods of time does not necessarily mean improved nutrition. Optimum nutrition will not result from saturation of the body with cheap vitamins at the expense of other nutrients or flooding the body with fats and carbohydrates so that the body systems never need to exert themselves to produce the energy required for the body activities.

The total approach not only is needed in work with humans, but it should also be applied in animal work. So far we have dealt largely with rapid growth during the very early period of the animal's life or with a few reproduction studies. We have rarely carried animals through the period of aging to study the effect of nutrition during this period.

McCay and co-workers have stressed the importance of restricted calories during the entire life-span of experimental animals in order to reduce the incidence of chronic diseases that usually terminate life prematurely. Are we justified in emphasizing restricted food intake for the sake of prolonged life? Some of the early studies were complicated by the fact that it was difficult to construct a diet which was known to be adequate in all the newer factors. This gives us the best reason why nutritionists have dealt with only short-term experiments. We need to know the existence of all nutrients before long-term experiments are planned. The results reported by McCay interested me sufficiently to force me to set up a very limited series of animals, even during the present shortage of help. We are using our standard purified ration with liver extract as a source of the unisolated vitamins. All rats receive exactly the same diet except in the case of the sucrose component. One group receives only sufficient sucrose to allow very slow growth, another group is allowed sucrose ad libitum, and the third group is given one-half the amount of sucrose consumed by the second group. Thirty per cent of the animals in the last two groups have shown respiratory trouble, while only one animal in the entire group on the restricted intake has shown any disturbance whatsoever. The animals have been on experiment only one year, and I do not know the true significance of the results; but I can see how the results may correlate with some of the earlier work mentioned. In any case, our friends in animal husbandry, who originally interested us in nutrition, will not be happy because the rats on the restricted calorie intake would not get very far in a show ring.

I have introduced some of the controversial problems for the specific purpose of emphasizing the need of continuous and total research and in order to point out that the application of laboratory results is not always easy. However, if fundamental and definite results are obtained, we need not worry about immediate clinical application. Past experience indicates that the individual human has benefited almost immediately from advances in nutritional research. The problems are greater, however, in the case of the larger groups of our population, since that involves an improvement in foods and foodstuffs in general. These are the problems which need greatest attention.

This short survey has made it clear that the basis for all improvement in human welfare through nutrition is dependent upon fundamental research. It is true that results of research, however significant, may not necessarily be of benefit to the human population, but we are certain that no one benefits if we do not look first to the work in the laboratory.

KNOWNS AND UNKNOWNS ABOUT WHAT CONSTITUTES AN ADEQUATE DIET

By L. A. MAYNARD[1]

THE primary objective of any food program must be to provide an adequate diet. Thus dietary requirements, as expressed in terms of specific nutrients, constitute the essential basis for evaluating the food supplies of populations and for planning food programs and policies which will best meet world needs. How sound and how complete is the supporting nutrition knowledge?

CALORIES

First of all, an adequate diet must contain a sufficient number of calories. Here the needs vary according to age, sex, and activity. Our knowledge of these physiological needs is reasonably adequate. The major difficulty in assessing the calorie needs of a population arises in classifying its members with respect to activity, for hard physical work doubles the calorie requirement for maintenance alone.

The minimum proportion of these calories which must be supplied as protein is fixed by the body's specific need for this nutrient. The proportion which should be supplied as fat is a physiological question of special importance economically because carbohydrates are the cheaper and much more abundant source. But we have very little physiological information as to what the fat content of an adequate diet should be.

Studies with rats have shown that certain specific fatty acids, notably linoleic, must be supplied in the diet for growth and health, because of the inability of the body to synthesize them from either carbohydrates or fats in general. The requirement here is of the order of 1 per cent of the total calories. Fortunately, these essential acids are widely distributed among food fats. For example, lard, soybean oil, cottonseed oil, and peanut oil are excellent sources. Assuming that the rat results may apply to man, a report approved by the Food and Nutrition Board has recommended that the human diet should contain 3 pounds per year of the fats which are good sources of the essential acids. Supplying approximately 10 per cent of the total calorie intake by these fats should meet body needs. In fact, a much smaller percentage would suffice if obtained from certain sources.

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Fats have other values in the diet which can be less specifically assessed. They reduce the bulk of food required to meet calorie needs, and this seems of special importance when the calorie requirement is high, as in hard work. Many observations have shown that diets which are too bulky are not adequately consumed and that they frequently cause gastrointestinal troubles. Diets with a liberal amount of fat are certainly much more palatable, which is a further reason why more bulky diets high in carbohydrates are less likely to be as well consumed. Physiologically, fat has an important satiety value, because its slow passage through the stomach delays hunger pains.

It is upon such general information and observations as these, rather than on quantitative data, that the Food and Nutrition Board has approved the recommendations that the diet in general should contain a minimum of 20–25 per cent of its calories in the form of fat and that for children and persons at hard work the desirable range should be 30–35 per cent.

It should be recognized that these recommendations apply only to Western peoples and that they are based more on food-habits preferences than on scientific data. Whether the needs of those Eastern peoples who now eat a diet containing less than 10 per cent of its calories as fat should be considered on a different basis remains a question.

Because it takes much more land and labor to produce calories as animal fat than as vegetable fat and because the latter is much the cheaper source, the relative value in the diet of these sources is an important question both economically and physiologically. There is no physiological evidence which justifies any generalization that animal fats are nutritionally superior to vegetable fats. The essential fatty acids are found in both, varying in amount according to specific source rather than according to class.

Certain fats are nutritionally more valuable than others because of their content of fat-soluble vitamins. Butter is the outstanding example here because of its vitamin A content. But there are many other food sources of this vitamin. The important physiological question is whether the unique fatty acid distribution in butter gives it a physiological advantage over other fats. Thus far science, despite many studies, has not been able to demonstrate any such advantage in a mixed diet. On the basis of rat experiments there is evidence that in the early weeks of life when lactose is the sole carbohydrate in the diet, butter fat is superior to vegetable oils in promoting growth. This represents a very special dietary situation. The findings may have significance in human nutrition during infancy, but this significance remains to be demonstrated.

PROTEIN

The optimum protein content of the diet is a subject which has been actively debated by both scientists and laymen for nearly a century. Fortunately, modern knowledge has greatly clarified the questions involved and has rendered untenable the old ideas held by many that high intakes of protein are physiologically harmful. Much more important, both physiologically and economically, is the question of the minimum nutritional need. This question can never be answered so specifically, for application to diets generally, as can be done for calories. This is the case because the specific need in protein nutrition is for the amino acids of which proteins are made, and different proteins and thus different foods vary in their content of the acids which are essential. There is general agreement that the present recommended dietary allowances for protein are fully adequate as applied to the usual mixed diets and probably more generous than necessary with certain food combinations.

With the recognition that certain protein foods are superior in amino acid makeup to others, it is customary to recommend that the diet contain some of its protein from these better sources. Modern research suggests that there has been some overemphasis here from the strictly protein standpoint. The superior growth response recorded for certain protein sources was later found to be caused, in part at least, by the then undiscovered vitamins in the foods in question.

Some of these later findings have a direct bearing on the question of the importance of animal protein in the diet. Research has been stimulated by the shortage of animal-protein concentrates in the war emergency. In reviewing the findings with respect to swine and poultry, Mitchell[2] has concluded:

"Available evidence rather clearly demonstrates that the great effectiveness of animal protein concentrates in promoting maximal production in swine and particularly in poultry is not due primarily to their protein constituents, but rather to their higher contents of certain vitamins, of calcium, of phosphorus and possibly of some of the micro-nutrients."

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[2] "Is Animal Protein an Essential Constituent of Swine and Poultry Rations?" in *Ninth Report of the Committee on Nutrition* ("National Research Council Reprint and Circular Series," No. 117 [1943]).

He recognizes, however, that vegetable protein concentrates are less efficiently utilized in digestion and metabolism and that the level of intake must be higher accordingly. Such evidence as is available suggests that these findings have application in human nutrition.

Like fat, the need for animal protein is an important question from the standpoint of the production problems involved in providing an adequate diet for the world's population, as well as in relation to the family budget. The United Kingdom Ministry of Foods has followed the policy in the war emergency that approximately one-half of the total needed protein intake should come from animal sources. This policy appears to have been based on morale and consumer-acceptance considerations as well as on physiological grounds. The Food and Nutrition Board of the National Research Council has made the following statement in the matter:

"There are not sufficient data for stating categorically the minimum amount of protein per day which must come from biologically superior protein foods. The *variety* of protein consumed should be stressed, and sufficient 'animal protein' should be included to prevent monotony of the diet to the degree where it might decrease consumption and thus affect nutritional status."

Certainly, animal protein is the preferred source, particularly from the standpoint of consumer acceptance, and liberal intakes are ingrained in the eating habits of the more economically fortunate peoples of the world. On the other hand, the vast numbers of Eastern peoples who have subsisted fairly well for centuries on diets containing less than 10 per cent of its protein from animal sources present a challenge to both the physiologist and the food economist.

The idea that hard work steps up the protein requirement has been dissipated, even though beefsteak remains the preferred food of the athlete and the manual laborer. An interesting experiment bearing on this question as well as the more general one of protein requirement has recently been reported by Stare and Thorn.[3] The experiment was carried on with workers in a civilian public service camp involving activity calling for calorie intakes of from 2,400 to 5,000

[3] F. J. Stare and George W. Thorn, *Amer. Jour. Pub. Health,* Vol. XXXIII, No. 12 (1943).

per day. Subject to the limitation of the short experimental period (8 weeks), the authors conclude as follows: ". . . . in the presence of sufficient calories from non-protein sources, the amount of protein in the ordinary diet of an active adult may be safely reduced to 50 gm. per day, of which as little as 5 gm. may be in the form of animal protein." This conclusion certainly furnishes support for the viewpoint that our current ideas as to total allowance needed and as to the importance of animal protein in the case of adults are, at least, liberal. But further studies over longer periods are needed.

In this discussion of the needs for protein and fat of both animal and vegetable sources, it has been my objective to bring out the latitude, strictly from the standpoint of nutrient requirements, which is possible in utilizing available food supplies. But this is not the whole story. A nutrition scientist can put together a combination of foods which would supply all the nutrients but which nobody would eat. Certainly, that would not be an adequate diet. Thus the question of palatability enters in a very practical way. Meat is the most palatable source of protein and it contributes palatability to the meal as a whole, thus helping to insure consumption of other less palatable foods which are important nutritionally.

No diet can be considered adequate for any group which does not correspond sufficiently to food habits to be adequately consumed. These habits can be gradually modified, and this is an important objective of nutrition education. But a diet which people have to be starved into eating will not prove adequate.

MINERALS

The quantitative needs of the body for the minerals which are most likely to be lacking in the available food supply, namely, calcium, phosphorous, iron, and iodine, are fairly well established. But questions remain as to the practical importance of certain factors governing their assimilation and their availability from certain foods. A recent finding which illustrates the significance which a changing food supply may have in this connection comes particularly from studies of the United Kingdom wartime flour. It has been found that the phytin left in this flour in milling decreases the availability of both its calcium and its iron.

Our knowledge is much less specific regarding some of the so-called "trace elements" that are required by the body. We assume that they are always adequately supplied in a diet which is complete in other respects. Recent findings with animals that there are large areas throughout the world where the soil, and thus the food crops, are so low in such minerals as copper, manganese, and cobalt as to cause serious nutritional troubles suggest that we need more quantitative information regarding their physiology and their occurrence in human foods.

There are many reasons why it is especially difficult to study the role of these trace elements directly with human subjects. Most of the information upon which current ideas as to their need in the human diet are based has come from studies with rats. We have learned that in the case of certain vitamins other animals provide information of more direct application to man than does the rat. This possibility must not be overlooked with respect to the minerals concerning which so little is known at present. A case in point is manganese, which plays a much larger role, or at least a much more obvious role, in bone formation in the chick and rabbit than in the rat. Data have recently been obtained with the chick and rabbits which need to be tested for their application to man.

VITAMINS

It is in the field of vitamins that the largest additions to nutrition knowledge have recently been made. This continues to be the most active field of nutrition research, and certainly there is much more to be learned, particularly with reference to the practical application of the more recent discoveries. That there are as yet undiscovered vitamins seems clear. Any adequate discussion of the "knowns and unknowns" in this field would extend far beyond the limits of present purposes.

The vitamin discoveries thus far made have resulted from experiments with several different species. It is helpful to recognize that not all of the definitely identified vitamins are needed in the diets of all species. Even though they may be generally needed in metabolism, certain species have the ability to synthesize certain vitamins from other constituents of their diets. For this reason ascorbic acid is not needed in the feed of the chick, though it is an essential constituent of the diet of man. The reverse is largely true of vitamin K.

With respect to man, we have reasonably good quantitative knowledge for planning diets and assessing food supplies in the case of thiamine, riboflavin, ascorbic acid, vitamin A, vitamin D, and nicotinic acid. Manifestly there are many gaps in this knowledge which need to be filled, and this is particularly true in the case of vitamin D. There is no basis at present for stating the quantitative needs for older children or for adults other than during pregnancy and lactation. It may be expected that current ideas as to the quantitative needs of the other vitamins mentioned may be modified by further studies. The present divergencies revealed in the conclusions reached by different workers indicate clearly the need for further research by improved techniques.

Our knowledge of the distribution of these vitamins in our food supply and of reliable methods for their assay has been greatly increased during the last two years, particularly by the activities of the Committee on Food Composition of the Food and Nutrition Board. Much has also been learned regarding the losses which occur in processing, storage, and cooking and how to lessen them. It has become clear that data as to the content of certain vitamins in foods as produced may greatly overvalue them as actually consumed. In terms of world food supplies our knowledge of their content of most of these vitamins is certainly meager. Many foods have not been studied at all, many others need reassessment by the improved techniques. The techniques themselves require further improvement.

With respect to the various other definitely identified vitamins, besides those previously discussed, our knowledge of the role of most of them in the physiology of man and of their need in his diet is very meager. Vitamin K, which is essential for blood clotting, does not appear to be required normally in the human diet because it is synthesized by microörganisms in the intestine. Vitamin K therapy has proved very effective, however, in certain special situations.

It is apparent from studies with several species that vitamin E plays a basic role in metabolism, but that human beings ever suffer from its deficiency remains unproved. There have been several clinical reports indicating a value for vitamin E therapy in preventing abortion, but there also have been reports to the contrary. This vitamin is very widely distributed in the food supply, and accordingly the possibility of there being an inadequate amount in the human diet to meet any body need seems doubtful.

Much has been learned about the physiology of choline and the pathological manifestations of its absence from the diet, but apparently human diets which are adequate in other respects can be relied upon to meet choline needs without the inclusion of special sources. This is particularly true because the need for this compound is not absolute. It can be synthesized in the body from other dietary constituents, such as methionine, which have "labile methyl groups."

That man suffers from panthothenic acid deficiency remains unproved. Its alleged role in preventing or causing gray hair in people seems definitely disproved. Similarly, there is no conclusive evidence at present that there is a need for pyridoxine, biotin, folic acid, inositol, or para-amino benzoic acid in the diet of man. All these vitamins appear to be rather widely distributed in the general food supply, but the actual data available are meager and the methods for their assay need much further development. Certainly, much more information is required along these lines.

It has long been known that rumen synthesis by microörganisms eliminates entirely the dietary need for thiamine, riboflavin, and other B vitamins in sheep and cattle. More recently it has been shown that such a synthesis in the intestine of monogastric animals, though much less extensive, has a practical significance. The intestinal synthesis of eight different B vitamins has been reported for the rat, and a similar finding for some of them has been established in the case of men. As has been shown, particularly with ruminants, the nature of the diet influences the extent of this microbiological activity. The complications involved in establishing dietary needs, especially on a quantitative basis, for the vitamins which are thus synthesized in substantial amounts are obvious. Recent findings that thiamine and nicotinic acid are appreciably synthesized in the human intestines under certain conditions may explain some of the conflicting quantitative data as to their dietary requirements.

There is evidence that the beneficial role noted for para-amino benzoic acid in rat experiments may be an indirect one in promoting the intestinal synthesis of unrecognized essentials. By contrast, a bacteriostatic action of sulfa drugs on intestinal organisms synthesizing B vitamins has been indicated by animal experiments showing that the ingestion of these drugs caused effects which could be counteracted by feeding special sources of the B complex. Further studies may develop information of special significance in connection with the treatment of infections. They also may result in the discovery of B vitamins not previously recognized because normally intestinal synthesis fully meets body needs for them, irrespective of the diet.

Such findings as these serve to illustrate the probability that there are undiscovered factors of practical importance in certain physiological or dietary situations. Much more needs to be learned also as to the significance in human nutrition of various factors which have recently been reported to be essential for the metabolism of various other species, including the lower forms of plants as well as animals. The alphabet has been nearly used up, and subscript numbers and letters have come into use in designating these factors. For many of them the question of their actuality still remains. What ones are actually new vitamins, what ones may be duplicates of others previously identified, or what ones are just mistakes are questions to be answered. Along the road where so many successes have been established in the last twenty years in the discovery of new nutritional factors, many discards are also strewn. This is all very puzzling and unsatisfactory to those who must interpret nutrition knowledge into practical feeding operations, but such is the inevitable course of scientific discovery.

The fact that many essentials of an adequate diet still remain to be characterized suggests clearly that the use of synthetic vitamins and even of fortified foods should not decrease the importance, in the minds of the consumer or the food planner, of a diet of natural foods which past experiments and experience have shown to be effective and essential. Otherwise, the cause of nutrition may suffer rather than be advanced by recent discoveries.

SOME GENERAL PROBLEMS

Among the general problems with which the question of an adequate diet is concerned, none is more important, or more puzzling despite much study, than the relation of nutrition to tooth decay. There is little evidence that dental caries has significantly lessened in its incidence in recent years despite the advances in both nutrition knowledge and in mouth hygiene and dental prophylaxis. Several different nutritional factors have been shown to play an essential role in the development and maintenance of sound teeth, and certain others apparently hasten their decay. But no dietary regime has been devised which thus far has contributed in any large degree to the solution of the problem. There may be nutritional factors as yet undiscovered. Obviously, there are other factors concerned in the general problem, and there are many who believe that nondietary causes may be the more significant. The importance of this field of study needs no emphasis. The complicated nature of the problem is evident from the limited results of practical value which have come from the extensive investigation thus far made. Much more needs to be known about the basic processes involved in tooth decay, and the knowledge and techniques concerned with all of the aspects which may be at issue, nutritional and others, must be mobilized for an integrated attack on this major public health problem.

The assessment of nutritional status is an essential basis for food planning for populations and for testing the effectiveness of the program adopted. This can be done by evaluating the food consumed in terms of dietary requirements. It can also be done by studies of the occurrence of deficiency states among the population as revealed by medical examinations. That the first procedure is subject to several limitations of present knowledge is evident from the previous discussion. For the second, the basic knowledge is even more limited. Most of the clinical methods for the determination of nutritional status are of very recent development, and certain of the interpretations being placed on the results obtained are questionable, according to many nutrition scientists as well as clinicians. Clearly, the medical assessment of nutritional status is making important contributions to nutrition knowledge. But, clearly also, the methods need much further testing before the significance of the results can be properly evaluated.

There is a strong argument for setting nutritional standards high, as goals toward which people should strive even though they cannot attain them. The less that is known about an essential nutrient, the higher is the goal which is likely to be set, as an insurance measure, pending the development of more specific information. This would seem to be justifiable also. But in food planning for populations, where large economic issues affecting both the country and individual families are concerned, it is necessary to consider the cost of the insurance in relation to the risk involved. Here there is a case for more realistic standards than represented by goals which may be placed unnecessarily high on an incentive or insurance basis. It is of primary importance to bring the mass of malnourished people up to a reasonably safe level. Setting a goal which only a few can hope to reach may be discouraging rather than otherwise. Nutrition scientists need to keep these considerations in mind in interpreting the results of studies thus far made and in planning further experiments to fill in the gaps in present knowledge.

THE CONTRIBUTION OF NUTRITION TO FOOD POLICIES

By PAUL R. CANNON[1]

NUTRITION will make its most effective contribution to food policies only if it shares actively in their formulation. If also, in the planning of these policies, nutritional principles are kept constantly in mind, nutrition can help both in the solution of many immediately urgent food problems and in the development of a sound long-term food program.

That there is now a critical food shortage in many parts of the world there can be no question. And because of this there are in many places multitudes of hungry, underfed peoples striving to escape the triple threats of poverty, hunger, and disease. Food in the reconquered countries will be difficult to secure; much of it will be low in quality and high in price; commerce will everywhere be disorganized, with individual and collective good will badly strained. Nevertheless, under such adverse circumstances nutrition must do all that it can to bring aid and renewed hope to these unfortunate victims.

Poverty, hunger, and disease are both economic and medical problems; and for their solution economists, medical scientists, and administrators must collaborate closely if their many victims are to be aided effectively. For the majority of these victims presumably only a little help will be required; for others help will come too late, because disease already acquired or accelerated on account of food inadequacies will have become irreversibly established. The most vulnerable groups, however, will be the infants and children, the pregnant women and nursing mothers; and help for these must surely have a high priority in the planning of any immediate food policy, because it is largely to the next generation that we must look for the reconstruction of our badly damaged civilization.

In briefly outlining ways in which nutrition may contribute to the solution of current food problems it is recognized that already some of them are being directly faced by the armies, U.N.R.R.A., and other agencies in Italy, France, and elsewhere. Nevertheless, it is the duty of all those interested in food problems related to the war to suggest ways and means which may make their solution more effective.

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LIMITATIONS OF NUTRITIONAL SCIENCE

In the development of any type of food policy, whether it be a short- or a long-term one, the part played by nutrition must obviously be limited by the fact that the principal function of nutrition as a science is to discover, evaluate, and make available facts which can be applied to the development of wise food practices. Fulfilment of this function, therefore, will require continual enlargement of the broad program of nutritional research which has been so well developed under the leadership of the government, the National Research Council, the Nutrition and other foundations, the universities, and the food industry. This program must even be expanded, if it is to satisfy the world's growing nutritional needs.

This is particularly true in relation to the problem of malnutrition and disease. For example, in the report of the United Nations Conference on Food and Agriculture[2] held at Hot Springs, in 1943, occurs the following statement:

> "There is clear and convincing evidence of the association between faulty diet and ill health. The ill effects of not eating enough of the right kind of food are manifold. In the first place, malnutrition leads to impaired vigor and lowered vitality, so that its victims cannot fully play their part as active and useful citizens. Secondly, the incidence of disease in general and the mortality rate among infants, young children, women in the childbearing period, and indeed among all age groups, are invariably higher in ill-fed than in well-fed populations. Recovery from disease is more prolonged when the diet is defective. Countries which consume the best diets have the lowest rates of mortality and the highest expectation of life. Thirdly, there are various common diseases, such as tuberculosis, which are directly associated with lowered resistance caused by malnutrition. . . . . Malnutrition in varying degrees is found in all classes and countries, but more particularly it is the close and constant companion of poverty, both national and individual. Poverty almost invariably means a poor and insufficient diet, and the latter is the main cause of the disadvantage of the poor in respect to health, so clearly shown by statistics of disease and mortality."

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[2] *United Nations Conference on Food and Agriculture, Hot Springs, Virginia, May 18–June 5, 1943: Final Act and Section Reports* (Washington: U.S. Government Printing Office, 1943).

These are indeed challenging assertions; if true, is it not time to determine what are the precise reasons for this unholy alliance between malnutrition and infection, in order that, in the formulation of a sound food policy, it may be possible to incorporate into it all of the essential food constituents?

As nutritional knowledge accumulates, it must also be made widely known, otherwise its application to human needs will be too long delayed. This will require an increasing emphasis upon nutritional education in colleges and universities, in medical schools, by the government, and by other agencies. Nutritional goals can be attained only if food policies receive strong approval by the public and if the reasons for their formulation are clearly understood. This is especially true of the problem of foreign relief feeding, where so much of the food must come from the well-fed nations; for, unless the citizens of these nations sympathize with the food policies decided upon, they are not likely to submit to continued food rationing after their wartime emotions have quieted down. Education for this purpose, if it is to be successful, will require patient leadership by men of demonstrated idealism.

HEALTH AND AGRICULTURAL POLICIES

Food goals and policies must obviously be integrated with agricultural policies, because upon these latter policies will depend the solution of the troublous world-wide problem of free or restricted food production. Here nutritionists in general will probably hope for some type of a program of expansion, agreeing with Mattill[3] that "certainly the world as a whole has never had enough food nor could it have enough by tomorrow or next year, but given ten years to reorganize agriculture and readjust distribution and consumption, perhaps it might." They will look forward, therefore, in agreement with the United Nations Food Conference, to "an expansion of the whole world economy to provide the purchasing power sufficient to maintain an adequate diet for all"; they will take this position because one of the main goals of nutrition is the eventual elimination of hunger and want; for if hunger and want and the fear thereof may be banished from the entire world, important causes of misery, inefficiency, and frustration may thereby be eliminated. This goal is undoubtedly far away; but, even though the path toward it will be long and difficult, the goal itself is surely worthy of our highest aspirations. Even now we may derive some encouragement from the fact that in such a relatively short time the incidence of several of the most widespread of the vitamin-deficiency diseases, notably scurvy, pellagra, beriberi, and rickets, has been remarkably reduced and that within but a few years the occurrence of simple goiter has been materially lessened merely by adding iodine to our table salt. It is not stretching the bounds of optimism too far, therefore, to believe that as nutritional research expands, more of the infectious, metabolic, and degenerative diseases will become better understood and thereby brought under better control.

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[3] Henry A. Mattill, "The Long and Short of Nutrition," *Science*, XCIX (1944), 521–25.

The elimination of outspoken deficiency disease, however, is but a step toward the ultimate goal; nutrition has as its final goal the attainment, throughout the entire span of life, of man's utmost physical and mental potentialities. Modern nutritional thought assumes that prolonged periods of inadequate nutrition, even if not manifested by readily detected disease, may lead to subclinical deficiencies which can be eliminated only by the adequate intake of all the indispensable food elements. In accordance with this point of view, good nutrition can no longer be thought of just in terms of "tolerable" or "passable" health; rather, its goal is the achievement, by optimal nutrition, of buoyant health.

POPULATION PRESSURES AND WAR

In the effort to secure for man an optimal diet everywhere, nutrition is too often powerless in the face, throughout the world, of increasing population pressures. For example, in the Far East, among its teeming millions, famine and pestilence are commonplace events. A. V. Hill, the British physiologist, has recently pointed out that more than half of the population of India, by any reasonable nutritional standard, is underfed. Nevertheless, the population there is increasing annually at a rate of sixteen per thousand, or six million persons. As a consequence, more food is required each year, food impossible to obtain whenever there is crop failure. Hence there follows famine such as that seen recently in Bengal. India is a modern example of the old Malthusian assumption that a population may tend to outgrow its food supply and, if not checked by prudent means, is eventually checked by the more ruthless methods of famine and pestilence.

Although the relationship of hunger and disease has long been recognized, the war has brought out its basic significance with greater clarity. When because of war the nutritional needs of entire populations become depressed to critical levels, infectious disease invariably takes a rising toll. Figures from Europe as recently as July, 1944, re-emphasize this fact.[4] Thus reports from the Netherlands say that "the mortality from phthisis has almost doubled between 1939 and 1942"; in Czechoslovakia "in some districts more than half the population have dysentery and more than half the infants die in their first year." But the cumulative effects of malnutrition and infection as seen so vividly since 1939 in Greece and Poland, France and Belgium, in Bengal and parts of China, are now too familiar to need repetition. The important question is: Can nutrition do anything to help correct them?

From the biological point of view, infection, in its broadest sense, is basically a nutritional problem; that is, all infectious microörganisms are foreign proteins and their elimination by the body is, from the standpoint of the host, a protein problem. The fundamental concept of Metchnikoff in his earliest studies of phagocytes was that phagocytosis is a phenomenon of intracellular digestion which is accomplished by the phagocyte with or without the participation of antibodies. In recent studies of this general problem the role of various dietary constituents has been further clarified. Thus it has been shown that the specific antibodies are complex aggregates of some of the essential amino acids and that these antibodies can be manufactured only from similar essential amino acids present in the food; moreover, it has been found that some of the vitamins, minerals, and proteins are necessary for the formation of red blood cells and leucocytes and for the more effective functioning of some of the phagocytic mechanisms. These findings warrant the inference, therefore, that an adequate food policy should provide for the inclusion in the average diet of those food constituents which help to promote an effective defense against infection.

NUTRITIONAL KNOWLEDGE AND FOREIGN RELIEF POLICIES

In approaching the imminent problem of large-scale foreign-relief feeding, most authorities are agreed that the greatest need is for energy foods, that is, for calories, in order that the liberated peoples may quickly get about the important task of meeting their own food requirements. Most will agree, also, that a realistic food policy must be based upon the assumption that the production and distribution of energy foods should be accomplished mainly by the liberated peoples themselves and that not much more than emergency aid in this respect can be supplied from the outside. Much has been said about the inadequacy of the 2,000-calorie ration for relief feeding; but, of course, this "standard" ration was devised primarily as an emergency measure with the object of bringing up to this caloric level those who are below it.

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[4] "Relief to Liberated Countries," *Lancet*, CCXLVII (July 1, 1944), 23.

But relief feeding is more than a problem of food alone—the food must be of the proper kinds if it is to serve its major purpose. Just the shipping into the reoccupied areas of so many tons of food as beans, edible fats, white flour, and sugar and its indiscriminate distribution cannot meet these needs efficiently; such a procedure in relief feeding will add to both waste and expense while depriving many persons of a chance to share in the necessarily limited relief benefits. Here nutrition can be of service in the execution of the relief program by supplying needed information to the Army and U.N.R.R.A. workers to aid them in the successful performance of their difficult tasks.

In the utilization of low-cost energy foods, nutritionists, for example, have already shown the high value of vegetable oils made into oleomargarine after fortification with vitamin A. Although the question of the comparative nutritional values of these oils and butter fat is still controversial, there is experimental evidence that oleomargarine can safely substitute for butter, in an ordinary type of diet, and can thereby serve effectively as a low-cost energy food.

It is particularly in the field of carbohydrate utilization, however, that nutrition in recent years has made some of its most brilliant contributions, namely, in the elucidation of the part played by various vitamins in cellular metabolism. Although all of these functions are still not completely understood, it is evident that, in general, the vitamins act in relation to cellular enzyme systems in the intermediary metabolism of food constituents.

The immediately practical significance of some of these discoveries may be illustrated by their relationship to the use of the so-called "protective" foods. It had been known for some time that, in the utilization of the energy foods, if too large a proportion of the calories was derived from such overrefined foods as sugar and white flour, vitamin and mineral deficiencies resulted. It is now known that, because of the essential relationship of certain vitamins to carbohydrate metabolism, improvement of these energy foods is possible, as evidenced by the fortification of breadstuffs with thiamine, nicotinic acid, and riboflavin. In this and other ways nutritionists are demonstrating the functional significance of vitamins; it is apparent, therefore, that in the development of an adequate food program there must be extensive and continued investigation of the kinds and amounts of vitamins found in various types of foods, the effects of cooking, processing, and storage upon them, and the ways to preserve them most effectively.

But, while energy foods, minerals, and vitamins are necessary for life, no one can grow normally or even maintain himself on them alone, nor can he regain weight lost because of undernutrition; lost tissues can be rebuilt only through utilization of the protein foods. It required a war to stimulate an awakened interest in the proteins and their nutritive importance and to re-emphasize the fact that without their dietary intake in adequate amounts there is a deterioration of such vital processes as growth, lactation, tissue-repair, wound healing, fluid balance, blood production, and resistance to infection.

For the effective utilization of the protein foods, inferior types will not suffice; they must also be of high biological quality. Nutrition now considers proteins not just as aggregations of amino acid "building blocks," but rather as assemblages of certain specific amino acids, called "indispensable" or "essential," which the body itself cannot manufacture but must obtain preformed in the food. To this extent, indeed, they resemble vitamins. As a result of the fundamental studies of Rose[5, 6, 7] and others it is now possible to evaluate protein foods in human nutrition in accordance with the percentage composition of at least eight of these amino acids, viz., lysine, tryptophane, leucine, isoleucine, methionine, phenylalanine, threonine, and valine. Presumably if any one of these amino acids is lacking from the diet, nutritional deficiency ensues. In other words, the nutritive potentiality of a protein must be evaluated in terms of its essential amino acid content.

Because of the importance of the essential amino acids in the eval-

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[5] W. C. Rose, W. G. Haines, and J. E. Johnson, "The Role of the Amino Acids in Human Nutrition," *Jour. Biol. Chem.*, CXLVI (1942), 683–84.

[6] W. C. Rose, W. J. Haines, J. E. Johnson, and D. T. Warner, "Further Experiments on the Role of the Amino Acids in Human Nutrition," *Jour. Biol. Chem.*, CXLVIII (1943), 457–58.

[7] L. E. Holt, Jr., A. A. Albanese, L. B. Shettles, C. Kajdi, and D. M. Wangerin, "Studies of Experimental Amino Acid Deficiency in Man. I. Nitrogen Balance," *Federation Proc.*, I (1942), 116–17.

uation of the comparative merits of a high and low protein intake, we can no longer discuss the problem too emphatically in terms alone of total daily protein consumption. For example, according to various standards of daily protein requirements which have been suggested as a sort of nutritional yardstick, 1 gm. of protein per kilogram of body weight has been generally regarded (for an adult) as a reasonable over-all allowance. With an omnivorous type of diet this amount of protein is usually sufficient; it may be inadequate, however, for a starved, anemic person who is trying to recover lost nutritional ground. It has been shown in blood donors, for example, that blood regeneration on an ordinarily adequate protein intake, as expressed in grams of protein eaten, can be significantly improved by the eating of additional animal protein. Furthermore, 70 gm. or more of protein eaten daily in the form of incomplete protein, such as white flour, degerminated corn meal, gelatin, or overprocessed cereal protein, will fail to promote growth or to bring about tissue regeneration, whether the latter be manifested as weight recovery, blood-protein fabrication, or hemoglobin production. It should be borne in mind that tissues, whether they be muscle, blood protein, or hemoglobin, are all complex proteins of varying amino acid composition and that, for their reconstruction, there must be available in the diet an adequate supply of the essential amino acids which are an integral part of these tissues' basic structure.

Finally, in connection with the problem of relief feeding, nutrition can make an important contribution to economy of performance. It would indeed be a tragic error if, in the formulation of a program of relief feeding, it could not be implemented properly because of food shortages or prohibitive expense. There is obviously a limit to the amount of food available for relief purposes; sooner or later, moreover, the American taxpayer will see the bottom of his financial barrel in so far as it affects his continued willingness to give his food away. We surely cannot hope soon to bring up to our high living standards those of the entire world; and probably little would be gained by depressing ours to those of less fortunate countries. All that we can reasonably hope to do at the present time is to exercise compassion, intelligence, and our utmost skill in alleviating the widespread miseries generated by the war.

In planning for short-term relief, therefore, financial considerations should not be disregarded. Here the service of nutrition can be invaluable in supplying information about those food constituents which can be most efficiently utilized. For example, after the caloric, protein, and other requirements for relief operations have been ascertained, these can in many instances be satisfied by the use of low-cost cereal foodstuffs. This is, of course, not a new idea. But it is not known generally enough that amino acid deficiencies of some of the cereal foods may be corrected in large measure by appropriate blending with other cereals richer in these essential amino acids. Thus white flour, because of overmilling, is deficient in some of the essential amino acids, especially lysine. And yet flour must constitute the basic foodstuff in relief feeding operations. The flour-enrichment program has corrected some of the vitamin and mineral deficiencies, but it has done nothing for the amino acid deficits. Consequently, if too large a proportion of the daily protein intake of a relief ration, supplied to persons already underfed, comes from white flour, lysine deficiency may result. However, now that nutritionists recognize the quantitative significance of amino acid content of foods and food mixtures, it is possible to correct the amino acid deficiency of white flour by the addition to the flour of milk solids, yeast, meat, or eggs or soybean, peanut, or cottonseed flours. But when low cost is essential, in order to stretch food to its greatest coverage, it is apparent that the cheaper cereal proteins offer the only practical way of correcting widespread amino acid deficiencies. By this general procedure it should be possible to combine many types of foods so as to give the most effective amino acid blending. This is one area, therefore, in which nutrition can help to make the scarcer and more costly protein foods go further by the placing of nutritional needs above the caprice of palatability and bad food habits. This does not mean, however, that every allowance should not be made for national customs, tastes, or even prejudices but that these can be guided or modified by nutritional knowledge and dietetic skill. In the latter respect, indeed, much progress has been made already in the development of flavors to enhance the palatability of many of the cereal foods.

In summary, we find that, from the viewpoint of nutrition, there are counteracting forces influencing the development of health or disease. On the one hand, poverty, undernourishment, and malnutrition lead in the direction of inefficiency, misery, frustration, and disease. Good nutrition, on the other hand, promotes efficiency, initiative, and vigorous health. The principal problem in the planning of wise food policies, therefore, would seem to be the problem of direction. Here nutrition can make an effective contribution.

AWARENESS AND ATTITUDE OF THE MEDICAL PROFESSION TOWARD FOOD IN RELATION TO HEALTH

By Ancel Keys[1]

THE STATUS OF NUTRITION

APPRECIATION of the existence of an important relation between food and health must have been one of the earliest developments of medicine. Even medicine as demonology placed high reliance on the virtues and evils of certain foods and dietary practices. Although we do not actually burn vitamins at the altar of the god of nutrition, some present customs may be nearly as wasteful. In any case, modern theories have a somewhat more material basis.

Good nutrition involves calories, proteins, vitamins, minerals, and "balance"; but the current interest is overwhelmingly focused on the vitamins, with proteins in second place. We should remember, however, that natural malnourishment and undernutrition is almost never confined to any single nutrient element.

The American medical profession is composed of some one hundred and fifty thousand doctors who are, for the most part, presently convinced that they are overburdened, that only the pathologist can know the final answer, and that the government should let the American Medical Association and Dr. Fishbein run American medicine. Besides these fundamentals, they will agree on many other things, but the present state of nutrition is not among them.

PRESENT NUTRITIONAL KNOWLEDGE

The problem for discussion here is not so much as to whether the medical profession is aware of relations between food and health. The real questions have to do with what "awareness" means in terms of accurate knowledge properly applied.

Unfortunately, there is much disagreement on what is accurate knowledge, let alone proper application. Everyone is in favor of good nutrition and would vote for nutritional improvement—provided he could specify the improvement. One example may suffice. A prominent internist states that half the population suffers from ariboflavinosis—that is, a lack of riboflavin, which used to be vitamin B_2 and before that was vitamin G. An equally eminent pediatrician counters by questioning whether there is such a thing as ariboflavinosis. A third prominent scientist reports that, without exception, all the workers in a big aircraft factory show signs of lack of riboflavin. And in our own laboratory we have tried for several years without success to find any ill effects from diets low in this vitamin.

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What does this mean? It simply means that we are not yet prepared to talk much about riboflavin to the general public, let alone promote legislation and intensive publicity campaigns on the subject. The question of the compulsory enrichment of bread comes to mind.

This is not the occasion to argue technical scientific points. We are now concerned with the use of present nutritional knowledge and the place of the medical profession in such application. Let us examine the attitudes—for they are plural—of the medical profession. From such consideration we may better judge both the potentialities and the actualities of efforts to promote health through food.

ATTITUDES OF THE MEDICAL PROFESSION

The most elementary classification of attitudes in this case has several categories. Unrestrained enthusiasm in some quarters for the newer claims for vitamins is almost equally matched by condemnation of "pseudo-scientific extravagance" in others. Among ordinary practitioners perhaps the most common attitude is a rather tongue-in-cheek acceptance of vitamin therapy as a valuable means of taking care of the perennial psychoneurotics, hypochondriacs, and ailing females who crowd the waiting-room.

Further, we have the proponents of "natural" as contrasted with synthetic vitamins, the protein enthusiasts, the sugarphobes, the advocates of extreme dietary frugality, and so on. The great range of these attitudes is significant and can only mean that real knowledge is limited or at least not disseminated widely even in the medical profession. I cannot credit the latter explanation and personally believe that, in spite of great advances, we are yet in the infancy of the growth and application of nutritional science.

THE REALM OF AGREEMENT

There are aspects of these questions which are by no means so controversial. It is agreed that the continued persistence of pellagra in the South is a disgrace which must be wiped out. It is agreed that rickets is still not very rare in this country and that it can and should be completely eliminated. There is increasing agreement that many of our hospital patients are kept in a state of semistarvation, which delays recovery and increases mortality. There is a rapidly growing belief in the virtues of a high protein diet in all post-traumatic and convalescent states. There is general agreement on the value of the school lunch for children. But even in these instances there are different attitudes as to *how* improvements are to be effected.

The consequences of real malnourishment and undernutrition are not covered by statistics on deaths from starvation or the incidence of beriberi and so on. The few available studies indicate that the most serious consequence is in the increase in mortality and morbidity from all types of disease. A recent study on French concentration camps is terrible testimony. There is unanimity of medical condemnation of such conditions, but in these extreme situations the attitude of the medical profession at present has small weight against the pressure of political and economic factors.

BETTER DIETS: MEDICAL PROFESSION, GOVERNMENT, AND RESEARCH

The present attitude of the medical profession regarding food and health is important in the attempts to further the public health through better diets. In the general field of food and health there has been some tendency to attempt political action before the medical evidence is properly in hand. This has created distrust in some medical quarters. I believe a substantial part of the medical profession is today resentful of coercion, particularly by government, on one or another question of the relation between food and health. In some cases this attitude may be reactionary, but for the most part I think it is founded on healthy skepticism.

If it should appear that there are defects in the present attitude, then this really means that the researchers must provide better evidence, that the reviewers should write more sober and critical reviews, that the commercial advertisers must be restrained, and that the sociologists must not outrun technical progress. There is little ground for complaint that the medical profession is indifferent.

THE USEFULNESS AND VALIDITY OF THE DIETARY ALLOWANCES

By LYDIA J. ROBERTS[1]

ALTHOUGH in this case it is like asking a parent to defend his own child, it is, nevertheless, a privilege to be able to defend the dietary allowances; for the more people there are who understand the purpose of the dietary allowances and how they are and are not expected to be used, the better it will be.

ORIGIN AND PURPOSE OF THE ALLOWANCES

The dietary allowances are, as their name indicates, estimates of the amounts of the various dietary essentials that it is deemed desirable to provide in the diets of individuals, by age, sex, and other conditions. They were adopted by the Food and Nutrition Board of the National Research Council in May, 1941, and also by the White House Conference on Nutrition which was held in Washington that same month. They were arrived at only after several months of work on them by a special committee assigned to the task and after many discussions of them by the whole board. The need for such allowances was recognized by the board shortly after it was organized in the fall of 1940. The board realized that one of its functions would be to advise on nutrition activities of many types during the war period and after. Indeed, that was the purpose for which it was created. It knew that to do this task wisely it should have some sound nutritional goals at which to aim. It is true that there were many dietary standards already in use—too many of them, in fact. But these varied greatly in the values set for the various factors and in the degree of acceptance accorded to them by groups needing such standards. The one proposed by the Nutrition Committee of the League of Nations probably had the widest use, but none of the standards then in existence had found universal acceptance.

The board decided that it would be desirable to have a thorough over-all review of the evidence to date and to secure in addition the judgments of a large group of research authorities as to the amounts of the various dietary essentials which would constitute desirable standards. This procedure was followed, and the allowances finally accepted by the board and by the White House Conference on Nutrition represent the result. Here, a little more than three years after their origin, we report on their usefulness and their validity.

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[1] Professor and chairman of the Department of Home Economics, University of Chicago.

USEFULNESS OF THE ALLOWANCES

The allowances have had an amazingly wide acceptance and use. They have served as the official guides in practically all nutrition enterprises in this country and to some extent in Canada and England as well. They have been the accepted yardstick for feeding the Armed Forces; the Quartermaster Corps has made great effort to see that the foods provided the men both here and abroad measure up to the allowances; and these allowances also serve as guides in planning relief feeding in occupied countries. They are used by government agencies in all their publications in setting up adequate diets for various purposes and in evaluating actual diets studied in dietary surveys. They are the standards used in the industrial feeding programs and in the state and local nutrition programs which are being carried on throughout the country under the guidance of the Nutrition Branch of the Office of Distribution. They have been incorporated into standard texts in biochemistry, nutrition, pediatrics, and other fields and, in short, have become the universally accepted nutrition goals.

Why have the allowances been so well accepted? There are several reasons. The first is that they were put out by the National Research Council, a body whose reputation for scientific caution and soundness is unparalleled. More important, perhaps, is the fact that they did not represent the opinion of one individual or small group, or even of merely the members of the board, but were rather the considered judgment of a large group of nutrition authorities. Every person with a basis for a judgment was entitled to offer it, and all submissions were taken into consideration in the final decisions. All workers realized that the consensus of authorities should prevail, and they were willing, therefore, to accept the allowances as tentative ones until further evidence was available to indicate that higher or lower values more accurately represent the need.

Regardless of whether the values set are the best or final ones, the net result of their use has been good. For the first time in history all groups have been using the same standards, and this has made for a unity of purpose and more concerted action than has before prevailed. Moreover, since the allowances aim to provide fully adequate nutrition rather than bare prevention of obvious deficiency symptoms, they are somewhat higher than some previously used. Striving to attain them has helped to raise nutrition in the country to a higher level.

Another service which the allowances have rendered is that they have stimulated research. The review of the evidence which the board had carried out revealed great gaps in our knowledge of what the requirements are for the different factors, and workers in many laboratories have been challenged to do research to fill in the gaps. Some workers have felt that some of the values are too high and have set out to determine whether they were right. Upholders of the higher values have similarly felt impelled to prove that they were right. This has been all to the good, for the allowances were adopted as only tentative ones with the promise that they would be revised when new evidence became available. The evidence which has been forthcoming since the allowances were adopted will be utilized for this purpose. Indeed, it is now being used in a contemplated revision of the tables.

VALIDITY OF THE ALLOWANCES

In statistical terms, "validity" means whether the instrument measures what it is alleged to measure. Since the values in question were put out by the board merely as tentative allowances, their validity in that sense could scarcely be challenged. They are what they were intended to be—*recommended allowances*. Take first the question of how valid the allowances are in the sense of representing actual requirements. Much more research must be done before that question can be fully answered. Something can be said, however, concerning the probable validity of the values set for the various factors. Perhaps the best way to indicate this is to point out where revisions are most likely to be made.

The writer does not anticipate any significant changes soon in the calorie values, though there will be some slight revisions to smooth them for certain ages for children. The present table is based on a substantial body of sound research and is adequate for the purpose for which calorie allowances should be used, namely, as guides to amounts to provide for individuals or groups, for whose feeding one is responsible. Every individual is, however, a law unto himself, and his needs may be expected to vary above or below these amounts, according to his size, activity, and bodily condition. Calorie standards should never be used as absolute values that any individual is expected to meet.

The protein allowances are likewise satisfactory for their purpose. We are looking forward, however, to the time when this requirement will be expressed, not in terms of protein, but in terms of specific amino acids. Thanks to the brilliant work of W. C. Rose and others now under way to determine man's requirement for each of the essential amino acids and that of Block and others who are studying the amino acid content of foodstuffs, we shall, in the not-too-distant future, be stating the allowances as the amounts of lysine, tryptophane, methionine, and other essential amino acids and planning diets to meet each of the individual ones rather than having an over-all value for protein. This will involve more work, but it will be far more satisfactory. Until that time comes, the present protein allowances may continue to be used as reasonable, but not excessive, standards at which to aim.

The calcium values for adults and the preschool age are based on a reasonably adequate body of research and will probably stand about as they are. The work of Mitchells, Steggarda, Outhouse, and others at the University of Illinois has contributed the latest and most conclusive evidence on the calcium needs of these ages. In a series of sixteen balance studies on adults, both men and women, they found that equilibrium was maintained in practically all cases on 9–10 mg. per kilogram. Taking the highest figure, 10 mg., this would amount to 0.70 gm. for a 70-kg. man. In order to allow some margin of safety for the few not in balance on this amount, the allowance was set at 0.80 gm. The same value was used for women in spite of their smaller average size to insure adequate stores for the possible drains of pregnancy and lactation. The preschool figures are also based largely on the work of the Illinois group. In a carefully controlled series of studies on ten preschool children they determined the minimum intake of calcium that would produce maximum retention. The allowance was set somewhat above the minimum found by these workers in order to insure a factor of safety. It is, I believe, a conservative amount and can easily be met by three cups of milk a day, or even by a pint if other foods are carefully selected. For the early school age the values given are supported by the work of Wang. For adolescence, unfortunately, evidence based on experimental work is almost totally lacking. The allowances were arrived at empirically by assuming that the needs of adolescence would be higher than at any other age. It is in this area in particular that further research is needed, and here the allowances may eventually be revised somewhat, either upward or downward.

The iron allowances are almost certainly higher than the actual requirement, especially for adult men. Recent evidence on iron metabolism indicates that iron is a one-way substance, that is, that what iron the body absorbs it keeps to use over and over again. Thus iron will be needed and absorbed all during the growth period and whenever there is a blood loss. It will be needed in the diets of children and in women during pregnancy and throughout their reproductive life. Adult men and women after the menopause will thus have no further need for iron, as they will use over and over again the stores they have accumulated during growth.

To express the true picture according to this evidence, then, the allowances for iron for men and older women could be put at zero, or only a few milligrams. The work of Leverton on young college women and that of Johnston on children aged eight to eleven years also indicate that the actual needs of these groups are probably somewhat lower than the allowances set. If, therefore, iron were a difficult substance to obtain in a diet, there could well be a revision downward of the allowances. However, the values are not difficult of attainment, and the foods needed to meet the iron requirement are also needed for other purposes. Moreover, this work on iron metabolism is relatively new, and not enough studies have been done on different ages and under varying conditions to convince all workers that the last word has been said on the subject. In view of these facts there seems to be no immediate necessity for revising the iron allowances, although such revision will doubtless eventually occur.

As to the validity of the vitamin A values, there is little to say. There is at present no method of determining the nutritional status for vitamin A, and hence no method for determining its requirement, that is generally accepted as valid. Most of the estimates of the need for this vitamin are based on studies of the amount required to maintain normal dark adaptation. Various types of instruments have been used, and the results have varied considerably. Since the method itself is not fully accepted, the allowances based on it can be only estimates. In the judgment of many workers they err on the generous side, though others are of the opposite opinion.

In spite of their lack of true validity, the allowances for vitamin

A are still reasonable ones to aim at in practical use. They are not difficult of attainment in otherwise good diets, and until convincing research is forthcoming as to the true requirements they can still be safely used as *recommended allowances.*

For vitamin C the evidence is more satisfactory than for any of the vitamins. This is true because methods of determining the needs are better developed, they are also simpler, and more studies have therefore been made on this factor. In general, these studies aim to determine the amount of the vitamin needed in the diet to maintain a normal blood level and to give a urinary excretion of a test dose that indicates a fair degree of tissue stores. It is gratifying to note that the results of various workers are in essential agreement when a given standard for adequacy is considered. That is, intakes of 20–30 mg. per day will prevent signs of scurvy; 60–70 mg. will maintain blood levels of 0.6–0.8 mg. per 100 cubic centimeters, or a fair state of saturation; and 100 mg. or more are required to attain complete saturation, represented by blood levels of 1 mg. or above.

The allowances originally set by the board were meant to represent a fair degree of tissue stores. They were agreed upon in personal conference by eight to ten of the chief research workers in this field. Evidence forthcoming since that time has in the main given support to the allowances. There has been some criticism of them as unnecessarily high, but these critics have been considering merely the scurvy-protective level rather than the safer level which the allowances represent. Reports from England have indicated that the population there is subsisting on very low vitamin C intakes without evidence of deficiency, but the flood values of groups tested have been very low. The board believes that there is no need in this country for accepting standards below complete adequacy. All evidence indicates that the allowances are not too high for this purpose, and they will probably be reaffirmed.

There has been more question about the validity of the allowances for the B vitamins—thiamine, riboflavin, and niacin—than for any other factors. This is due chiefly to the fact that evidence based on sound research was meager at the time the allowances were formulated. For thiamine the most comprehensive study was one of Williams, Wilder, *et al.*, at the Mayo clinic, on the effect of an induced thiamine deficiency in human subjects and the amount required to restore them to normal. This was supplemented, however, by a number of less extensive studies, as well as by the work on animals and by the judgments of many research workers. For riboflavin a study by Sebrell, of the United States Public Health Service, constituted the chief evidence. In this study women subjects were depleted until deficiency signs appeared, and then the amounts of riboflavin required to restore them to normal were determined. The results were confirmed by the work of Strong *et al.*, at the University of Wisconsin, and by the relationship between thiamine and riboflavin requirements as found in experimental animals.

The allowances for niacin were largely derived from calculations on the requirements of dogs as found by Elvehjem and the relationship between this and the other B vitamins. They were supported by observations on human subjects submitted by various research workers.

Such was the evidence for the B vitamins at the time the allowances were first set up. Since that time a considerable amount of research has been done which has gone far in testing the validity of the allowances, though the final answer is not yet attained. Outstanding have been the extended studies of Williams *et al.* on both thiamine and riboflavin requirements of women subjects; those of Keyes, both on soldiers engaged in heavy activity and on college students; and more recent ones by Barborka, Ivy, *et al.* on trained young men subjected to varying degrees of physical activity. A fair number of less comprehensive studies supplement these. Without going into the details of these, it may be said that the findings of the different workers are in fair agreement when the same criterion of requirement is used. The chief difference lies in the interpretation put on the findings.

There are, for example, several stages in the manifestations of deficiency of these water-soluble vitamins. In order of severity these are: (1) decreased urinary excretion, indicating a depletion of body stores; (2) subjective symptoms, such as easy fatigue, depression, irritability; (3) biochemical defect in the metabolism of carbohydrate, indicated by rise of pyruvic and lactic acid in the blood; and (4) definite clinical signs of polyneuropathy.

The level of intake at which these various signs appear does not differ materially with different workers, but there is disagreement as to which level the allowances should aim to meet. To illustrate:

At 0.22 mg. of thiamine per 1,000 calories and below, most workers found definite clinical signs of deficiency in their subjects. Most would therefore agree that this is too low.

At 0.31–0.35 mg. per 1,000 calories, neither clinical signs nor biochemical defect are observed, but some, though not all, workers find subnormal urinary excretions. This level is regarded as adequate by some workers, only marginal by others.

At 0.45–0.50 mg. per 1,000 calories no clinical or biochemical signs appear, and urinary excretions are usually satisfactory. Practically all consider that this level is adequate, and some that it is unnecessarily high.

Varying levels are similarly observed and interpreted for riboflavin.

The difference among workers hinges on whether the allowances should be only sufficient to prevent clinical or biochemical signs of deficiency or whether they should be sufficient to maintain a fair state of tissue saturation as indicated by urinary excretions. The members of the board in general favor the latter view, but they are giving due consideration to the judgments of the other group.

Whatever the final figures may be, it seems probable that there will be some revision downward of the thiamine and riboflavin allowances, as indicated by the more recent research. This is especially indicated for riboflavin and for both thiamine and riboflavin in the upper-calorie levels. It is generally accepted that these vitamins bear a relation to calories, but it seems probable that the need for them does not necessarily increase at the same rate in the higher-calorie brackets. It would be premature to say just what values will be eventually accepted as the most valid, but they will undoubtedly be somewhat lower than the present ones, especially for riboflavin and for both thiamine and riboflavin at the upper-calorie levels.

There is no new evidence to justify any change in the niacin values at the present time.

It is seen from this review that the validity of the allowances varies with the constituent. Some are probably as close to the real requirement as it is essential to come, others will soon be revised to approach closer to it. All need more research before the final value is set for all categories. This is especially true of vitamin A and the B vitamins and for all factors for adolescence and for pregnancy and lactation.

USE AND MISUSE OF THE ALLOWANCES

The allowances were designed as the amounts it is desirable to provide in the belief that they will meet the needs of the average individual. It is believed that they represent a modest but not excessive nargin of safety. How large that margin is will not be known until urther research is carried out. The allowances were never intended o be regarded as absolute values which every individual must meet r be undernourished. They are to be considered as guides to use in roviding dietaries for individuals or groups. When the contemplated evisions which have been outlined are made, they can continue to e used as they were originally intended to be, as recommended alowances (Table 1).

TABLE 1[*]

Recommended Dietary Allowances

(Food and Nutrition Board, National Research Council)

	Calories	Protein (Gm.)	Calcium (Gm.)	Iron (Mg.)	Vitamin A (I.U.)[†]	Thiamin (B_1) (Mg.)[‡]	Riboflavin (Mg.)	Niacin (Nicotinic Acid) (Mg.)	Ascorbic Acid (Mg.)[‡]	Vitamin D (I.U.)
Man (70 kg.):										
Sedentary........	2,500	......	......	......	......	1.5	2.2	15	......	......
Moderately active	3,000	70	0.8	12	5,000	1.8	2.7	18	75	§
Very active......	4,500	......	......	......	......	2.3	3.3	23	......	......
Woman (56 kg.):										
Sedentary........	2,100	......	......	......	......	1.2	1.8	12	......	......
Moderately active	2,500	60	0.8	12	5,000	1.5	2.2	15	70	§
Very active......	3,000	......	......	......	....	1.8	2.7	18	......	......
Pregnancy (latter half)..........	2,500	85	1.5	15	6,000	1.8	2.5	18	100	400–800
Lactation.......	3,000	100	2.0	15	8,000	2.3	3.0	23	150	400–800
Children up to 12 years:										
Under 1 year‖....	100/kg.	3–4/kg.	1.0	6	1,500	0.4	0.6	4	30	400–800
1–3 years¶.......	1,200	40	1.0	7	2,000	0.6	0.9	6	35	§
4–6 years.......	1,600	50	1.0	8	2,500	0.8	1.2	8	50	....
7–9 years........	2,000	60	1.0	10	3,500	1.0	1.5	10	60	....
10–12 years.......	2,500	70	1.2	12	4,500	1.2	1.8	12	75	....
Children over 12 years:										
Girls, 13–15 years.	2,800	80	1.3	15	5,000	1.4	2.0	14	80	§
16–20 years.	2,400	75	1.0	15	5,000	1.2	1.8	12	80	....
Boys, 13–15 years.	3,200	85	1.4	15	5,000	1.6	2.4	16	90	§
16–20 years	3,800	100	1.4	15	6,000	2.0	3.0	20	100	....

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[*] Tentative goal toward which to aim in planning practical dietaries; can be met by a good diet of natural foods. Such a diet will also provide other minerals and vitamins, the requirements for which are less well known.

[†] Requirements may be less if provided as vitamin A; greater if provided chiefly as the pro vitamin carotene.

[‡] 1 mg. thiamine equals 333 I.U.; 1 mg. ascorbic acid equals 20 I.U.

[§] Vitamin D is undoubtedly necessary for older children and adults. When not available from sunshine, it should be provided probably up to the minimum amounts recommended for infants.

[‖] Needs of infants increase from month to month. The amounts given are for approximately 6–8 months. The amounts of protein and calcium needed are less if derived from human milk.

[¶] Allowances are based on needs for the middle year in each group (as 2, 5, 8, etc.) and for moderate activity.

FURTHER RECOMMENDATIONS, ADOPTED 1942

The requirement for *iodine* is small; probably about 0.002–0.004 mg. a day for each kilogram of body weight. This amounts to about 0.15–0.30 mg. daily for the adult. This need is easily met by the regular use of iodized salt; its use is especially important in adolescence and pregnancy.

The requirement for *copper* for adults is in the neighborhood of 1.0–2.0 mg. a day. Infants and children require approximately 0.05 mg. per kilogram of body weight. The requirement for copper is approximately one-tenth of that for iron.

The requirement for *vitamin K* is usually satisfied by any good diet. Special consideration needs to be given to newborn infants. Physicians commonly give *vitamin K* either to the mother before delivery or to the infant immediately after birth.

OBSERVATIONS OF PARTICIPANTS

M. R. Benedict (University of California): What about the possibilities of food yeast as a supplement to proteins?

Paul Cannon (University of Chicago): It is a promising means of improving overmilled white flour. We have performed only one experiment with a food yeast, and in this we tested only one variety of yeast. We found this particular yeast an excellent protein in comparison with animal protein, wheat, and corn germ.

Robert E. Griggs (chairman, Division of Biology and Agriculture, National Research Council): What are the quantitative possibilities of food yeast, that is to say, how much yeast will a person take in his diet?

Mr. Cannon: Inasmuch as yeast is added to proteins to correct amino acid deficiencies, the amount will depend upon specific amino acid deficits. In the case of white flour the principal amino acid deficiency is in lysine. Dr. Breese Jones, of the Department of Agriculture, has shown that the protein value of white flour can be markedly improved by the addition of 5 per cent of soybean flour. Much of the improvement is due to the lysine in soy flour. Presumably, less than 5 per cent supplementation with yeast would be adequate so far as white-flour reinforcement is concerned.

L. A. Maynard (Cornell University): Last year a paper was published which covered some work which our people at Cornell did at the Brooklyn Navy Yard where a dietitian familiar with large-scale cooking went down to study the incorporation of yeast into the various food combinations which were being used and to test a large number of foods with respect to the amount of yeast which could be incorporated without making any difference in palatability. This study did show that 5–10 per cent of yeast could be incorporated with certain foods; with other foods it was not possible to incorporate any without the taste showing up. If we are short of protein, yeast is one of the good possibilities. There are some developments in prospect, particularly some of these people in England are considering the large-scale production of yeast at prices which seem very low.

R. E. Buchanan (Iowa State College): With reference to the utilization of yeast and similar fungus proteins, is it not possible that we can make indirectly good use of farm by-products—cull potatoes and things of that kind—by converting them into yeast or fungus proteins for use as animal feeds through the use of cheap nitrogen? We will have immense quantities of artificially fixed nitrogen available after the war. We can use those to fertilize our poorer soils and grow additional crops, or we can take them into the laboratory and utilize them for fertilizing yeast cultures and convert our cheap carbohydrates into proteins. Do you see any possibility of increasing our animal feeds through the use of these fungus proteins?

MR. MAYNARD: This certainly is a possible development from the standpoint of microbiology, and worthy of study from the standpoint of animal feeding.

E. TWENTYMAN (British Food Mission): The importance of yeast was impressed upon the British food authorities in England at one time and given a great deal of consideration by nutritional and other experts. It was definitely turned down as a supply proposition.

MR. GRIGGS: Is it true that the British experimental pilot plant for the production of food yeast has been discontinued?

MR. TWENTYMAN: Yes.

MARGARET REID (Iowa State College): What is the significance of the high sugar content of the American diet, and also the diet of certain European countries?

MR. MAYNARD: Sugar is a cheap energy food. We know that the danger in the very large consumption of sugar is that it may exclude from the diet other nutrients which are important, because sugar is an energy food only. We must be certain to get all the other nutrients before we fill up on sugar. There are various reports with respect to sugar. Some believe that sugar has deleterious effects on teeth. Dr. Elvehjem reported results to us with respect to the influence of sugar on the development of respiratory infections.

A. C. ELVEHJEM (University of Wisconsin): The relationship of sugar to the intestinal flora is probably a very important point. We used to eat diets that were relatively high in starch, some cellulose, and other less rapidly digested carbohydrates, which found their way down the intestinal tract and gave a good medium for the bacteria to grow on. This growth of the bacteria is beneficial to the individual. Sucrose or cane sugar is very readily soluble, probably is absorbed very high up in the intestinal tract, and gives very little food for the bacteria to live on. You may turn that around the other way: the ready availability of sucrose in the mouth may give rise to growth of bacteria that are detrimental to the teeth. So we have the flora in the wrong place rather than in the digestive tract.

THEODORE W. SCHULTZ (University of Chicago): There has been no discussion of the problem of excess intakes of food—the incidence in both a biological and a pathological sense, and, from the standpoint of an economist, the extra loss involved. Do we not have in our modern society a good deal of malnutrition caused by diets being excessive in one or more elements?

MR. CANNON: From the standpoint of pathology, overeating and resultant obesity are important problems. Obesity is serious because of its effects in shortening life-expectancy and predisposing to diabetes, etc. There may be an important relationship, also, between overnutrition and arterial disease. It has been shown experimentally that arterial disease resembling in some respects arteriosclerosis of man can be produced in rabbits by feeding a diet high in cholesterol. Dr. Dragstedt, of the Department of Surgery of this university, has performed experiments using an extract of the pancreas which he regards as a hormone and which he thinks may be of some value in the correction of fatty disturbances of the liver and blood vessels, which may be produced in part by overnutrition. These are just a few of the problems which might be thought of in connection with excessive intake of food.

JOHN B. CANNING (War Food Administration): Palatability can be considered with respect to the individual dish, and it is the common experience of all good cooks that it is easy to compose a meal around a meat dish and that all of the items that go along with it will be eaten with enjoyment. If you want to create a deep and abiding appeal for nutrition, it is better to reach out to the interest of the cooks and housewives.

MR. MAYNARD: Meat is the most palatable source of protein. More and more we are tying together cooking and palatability tests with studies of nutritive requirements and values.

JOHN D. BLACK (Harvard University): What about the experience of Dr. Roberts in studying the Puerto Rican diet. Is not palatability largely a matter of habit?

LYDIA ROBERTS (University of Chicago): Our desire that meat should be the center of the meal is a custom which has grown up from habit. In Puerto Rico beans are the center, holding the place that meat does with us. Most Puerto Ricans would not consider a meal a meal unless it was based around beans—rice and beans.

Puerto Ricans would very much rather give up meat than give up beans.

MR. MAYNARD: Palatability is largely a food habit, but the problem of changing food habits in any short time, particularly of adults, is a very difficult one.

HOWARD TOLLEY (Department of Agriculture): Considering relief needs of liberated countries and the demand for sugar in the United States, it is felt in Washington that we are facing a real shortage; there will not be enough sugar in the world in 1945 and 1946 to supply requirements for relief and the needs of the people in the United States. The next step is to increase the production of sugar not only in tropical and other countries but also in the United States, with all of the economic implications, national and international. If the United States and the United Nations go in that direction the next year or two, are they going contrary to what science and health require?

MR. MAYNARD: We are not going to have a shortage of sugar in terms of nutritional needs, and we would be better off if our United States consumption were cut—not because of any specific harm from sugar itself but because it does tend to exclude from the diet other things which are more important.

MR. GRIGGS: When sugar rationing was in contemplation, the O.P.A. asked the Food and Nutrition Board for an opinion as to the probable effect of sugar-rationing measures, and different members of the board expressed their judgment based on their experiences and then those were compiled by the secretariat and synthesized into an opinion which was then approved by the board and sent to the O.P.A., which, however, did not pay any attention to this judgment.

JOHN LINDBERG (League of Nations): Would it not be a good policy, rather than resisting the consumption of sugar, to fortify sugar by different food elements?

MR. ELVEHJEM: Going back to the point that Dr. Schultz raised, we should be concerned with overnutrition. There are many people that consume too many calories and too many other food materials. Dr. Cannon gave examples largely in the field of humans. It is only in the case of humans that we do have serious overnutrition. Many people eat too much because our food is too palatable. It may be wise to take steps to reduce the palatability of some of our foods. We probably should starve humans into eating the right foods. We have done a great deal of work with dogs; and when we first started, the first thing that the people manufacturing dogfood said was that we must give them a different diet every day or the diet would become monotonous. "You must put in all kinds of flavoring to make it palatable." It is true that if you shift a dog from his usual diet to another diet, regardless of how complete, that dog will reduce his food consumption, but only for three days. When you starve that animal for a day or two, he will eat the diet you give him regardless of the palatability of the diet. I, for one, would like to suggest that it might be well to starve humans into eating the right kind of food.

MR. SCHULTZ: Why do we not have more statements by nutritionists that bear on the malnutrition caused by overconsumption of certain foods?

MR. ELVEHJEM: The suggestion is very good. There has been another approach to this problem. There are two ways of counteracting overintake of calories. One is to reduce the caloric intake, the other to increase exercise. There is at present considerable interest in a more extensive physical-education program. Such programs should be correlated with proper nutritional controls.

FRANK G. BOUDREAU (chairman, Food and Nutrition Board): Nutritionists do not think that the problem of overnutrition—overconsumption of calories—is to be compared in any way with the problem of malnutrition. Practically every nutritionist and almost all medical men who have studied the subject agree that the real problem is the underfeeding of millions of people throughout the world.

MR. BLACK: This sugar problem has this importance in its international implication: In Denmark they consume as much sugar as we do in the United States. They have no tariff duties on it. In many countries of Europe sugar is very expensive, as a result of high tariff duties supporting the domestic beet-sugar industry. The International Sugar Agreement which has been developed is making an effort to correct this disposition of European beet-sugar countries to expand their production and to let future expansion take place in the exporting countries that can produce cane sugar more cheaply. If European countries would import their sugar in place of making their citizens pay three times what they could buy it for abroad, their sugar consumption might rise to a hundred pounds per capita per year as in Denmark.

MR. GRIGGS: You know Dr. Maynard has recently had an extended visit in Britain and has been considering carefully and in detail the relative food supplies of the two countries.

Mr. Maynard: It would do no nutritional harm to the United States to decrease further its sugar consumption; even though there has been a considerable decrease from the period prior to the time we entered the war. I think we could justifiably reduce it to the same point the British have reached.

Mr. Black: There is another implication in Professor Schultz's question that might be developed. Dr. Cannon dealt with it purely in its pathological phases of overeating. Suppose you have a country with an inadequate diet. Shall you use the limited food resources of that country to raise all diets immediately to the full recommended daily-allowance level? Is that the best strategy? Or is the best strategy to attempt to raise the diets of those that are low up to a moderate level? This is just another phase of the question of economy of use of limited resources. The answer is, of course, the second.

Dr. Boudreau: We might remember that there has been a remarkable wartime experiment in the United Kingdom where the diet of those in the upper-income classes has been greatly reduced during the war while the diet of the poorer people, the lower-income classes, has been considerably improved. By-and-by, when we are able to analyze the data that have come out of this experiment, it may throw some light on the evils of overconsumption and the benefits of reduced overconsumption, but in the meantime it has had the most beneficial effects on those elements in the community most liable to high disease and death rates.

Allan G. B. Fisher (New Zealand Legation): In a long-range program, a program running beyond two or three years, the effort to discriminate sharply between what is done for one part of the population and what you are doing for another would tend to break down. It would also encounter another considerable difficulty, arising from the fact that it is practically certain that those who are worst off nutritionally will also be worst off in many other respects. If we say, "Well, the first task is to raise their nutritional standards," we are, in effect, announcing to these people that, whatever they may think about it, nutrition is more important for them than housing or clothing or any of the other things they might like to spend their incomes on. If we say that the No. 1 task is to concentrate on the most nutritionally deficient people, we are thus in effect refusing them any right of choice between improvement in that direction and improvement in other directions which might appeal to them at least as much. This is really a very fundamental problem which is concealed beneath a great deal of the discussion of nutritional reform. It assumes that people can be told, "This is the one line along which your economic position is to be improved," which is a highly disputable proposition.

MR. GRIGGS: The very essence of Sir John Orr's philosophy which was reflected in the Hot Springs Conference is food for need—that food should be produced and supplied to those who need it regardless of purchasing power.

MR. FISHER: But would it not really be more fundamental, more satisfactory to both the people concerned and to the economy in general, if instead of saying, "If food is deficient we will take direct steps to make certain that adequate supplies of food are available for certain people," we said, "Incomes are insufficient" and got down to the more difficult but much more important task of insuring that incomes become adequate?

MR. BLACK: In the United States we selected upward of a million of our six million farmers who were low-income farmers and proceeded to work out food programs for them. We proceeded on the assumption that, left to themselves, they would not have the means or the understanding wherewith to plan good food-producing and food-consuming programs. We worked out farm and home plans for them that included the kind of foods they need and helped them to produce these at home or to obtain the means wherewith to buy them. In the cities, we developed the Stamp program as well as the school lunch program, in which we also singled out low-income families and supplemented their diets. Now it is a very practical question as to whether this is a rational approach or whether we should go back to the straight A.A.A. approach, which is to raise all farm prices so as to raise all farm income, hoping that the low-income people will get some benefit out of it.

MR. FISHER: It is not entirely a question of raising farmers' incomes. The essential trouble is that there are a great many people in this country, as in other countries, farmers and others, who do not have big enough incomes; the real issue is whether, either in the short run or in the long run, you are likely to get more satisfactory results by, so to speak, corralling the people with the small incomes and saying, "By special devices we will give you more and better food," or going straight to the root of the matter and trying to insure, by a broader economic approach, that the number of people with small incomes shall diminish until ultimately there are no people in that group at all. In a nutritional program it is often assumed, without proper examination of the implications of the choice, that the first line of approach is the only one worth considering.

MR. GRIGGS: If it is true that better nutrition will improve public health where nutrition is quite bad, and better health will then reduce disease and time wasted or lost through sickness and in taking care of those who are sick by those who might be producers—if all that is true, then better nutrition of itself would become one of the more powerful economic lifts to help low-income people increase their economic productivity.

MR. SCHULTZ: In the Corn Belt and the whole dairy area of the United States, we are supporting a huge animal population; in feeding animals we do not have to be so greatly concerned about taste and palatability as we are in human consumption. Would you translate the knowledge we now have of nutrition as to proteins, carbohydrates, and other food elements, if it were applied to the animal population that we are supporting, as a part of our food supplies in the United States? Would it greatly cheapen the feed required to produce our milk, eggs, pork, and beef?

MR. MAYNARD: For animal feeding, if we should go over to vegetable protein in place of animal-protein concentrates, the change probably would not cheapen feeding a great deal, because some of these concentrates are animal by-products which would not be used for human diets anyway. Furthermore, when we give up animal-protein concentrates, we have to find substitute sources of riboflavin and phosphorus and other nutrients, as well as the protein present.

W. W. WILCOX (University of Wisconsin): The possibility of lowering the cost of animal production is more in the direction of increasing our protein supply to balance our carbohydrates that we are now producing in abundance in the Corn Belt and the Great Plains. The increase in soybeans which has taken place in the last few years has tended to give us an added supply of badly needed protein to balance the carbohydrates.

The real significance of the other point is that, by blending animal and vegetable proteins, we can make our animal proteins go much further and thus can get along with much less skim milk than we have been using for feed.

We have been wasting, on some farms, our high-quality animal proteins by feeding entirely animal proteins to balance our carbohydrates. There is no question but that a blending of the vegetable and animal proteins in the animal-feeding field will make them go much further; but, even so, our protein supply is still too small in relation to our carbohydrates in animal feeding, and we could get a better balance by increased production of the high-protein feeds rather than our high-carbohydrate feeds.

Mr. Tolley: How can we expand protein-feed supplies except by growing soybeans?

Mr. Wilcox: Soybeans are the outstanding example. Alfalfa is another. We have very great possibilities, in dairy-cattle feeding, of improving alfalfa. Of course, one of the real contributions of the cotton crop is its cotton seed.

Mr. Canning: Would a better handling of alfalfa be as important as increase in acreage?

Ezra J. Kraus (Department of Botany, University of Chicago): There is an appreciable loss of the nutrients used by animals in alfalfa as now handled. Its vitamin A content sometimes runs from 300 units when harvested to 50 units when fed. If there is any way of preserving that—and there is good reason to believe that there is a possibility not only of preserving it but also of increasing it both in the field and through methods of harvesting and storing—that may be a major gain. Already the processors of alfalfa are concerned. No doubt much of the vitamin A may be preserved at a cost which is very nominal. Then there are better methods of growing the alfalfa—the way it is produced or irrigated. It is possible to produce a higher protein content as well as increase its content of vitamin A. Increasing acreages is one way to increase available feed, but if we continue to increase acreages without doing something to preserve what is produced on those acres, the final product is often so low in nutritive value that handling charges are rarely met. Something of major food value should be grown instead of something of very questionable food value to stack away in the barn. By spraying plants with some of the more recently discovered growth-regulating substances it is possible to make the plants much greener and get more yield per acre. These offer real possibilities for increasing not only the amount of feed produced but its total nutritive value as well.

Mr. Black: As to how much we could save by shifting over to a vegetable-protein and vegetable-oil diet, away from animal sources of such material, one needs to sit down to do some hard figuring; a little of that has been done. Dr. Wilder did some of it when he worked out a certain model diet for this country on the assumption that there was a scarcity of food here.

Assuming that grass and forages are the only ways of utilizing our rough lands, that these must be fed to livestock because humans cannot eat them, but that other land can be devoted to growing of those kinds of vegetable proteins, oils, and carbohydrates that utilize those lands most economically, the costs of producing a food unit of the sort we are talking about in this country could be reduced, I expect, fully a half without much difficulty.

MR. ELVEHJEM: The problem of decreasing the cost of animal production is a very important one—one that may be a long-time problem. One point that has not been mentioned so far is the use of urea in feeding dairy cattle and thereby expanding the protein supply indirectly, or other means of treating carbohydrate materials with ammonia and treating sugar-beet residue which has big possibilities in the future. Take the chicken, for example. Where we used to feed milk products and meat-scrap and fishmeal, we can probably eliminate all those materials from the ration of a chicken. We should have to add riboflavin, but riboflavin will become very cheap and it will probably be better to feed chickens riboflavin than to get humans to eat it.

You can go on, and you will probably have to add choline. Choline will probably become cheap after the war is over when the chemical manufacturers look for something else to manufacture. You will probably have to add some methionine. You can probably synthesize methionine very cheaply. That can be fed to chickens rather than advertise it and give it to humans. And so on down the line.

P. LAMARTINE YATES (United Nations Interim Commission on Food and Agriculture): To revert to Dr. Black's suggestion of the possibility of introducing into human diet more vegetable and less animal proteins. What would be the objective? The result would be to free more labor for the production of material goods—iceboxes, radios, and the like. A parallel economy would be to teach musicians to compose symphonies for, shall I say, two violins instead of twelve and to dispense with horns and clarinets. Should there not be an aesthetic pleasure in eating as in music? If so, why should this country be miserly with its resources instead of being anxious to increase enjoyment and appreciation?

MR. BLACK: I am in favor of "food symphonies" for the United

States, too. But what about some parts of the world where they cannot afford food symphonies? Before Mr. Yates leaves the country, he may become acquainted with the southern Appalachian region and some other considerable sections of this country where even our own people can't afford food symphonies.

GEORGE K. ANDERSON (secretary of the Council on Foods and Nutrition, American Medical Association): Doctors have rather limited interest in nutrition because their training in that field has been too restricted. Most doctors in practice graduated in medicine before nutrition became an important subject. Little was known about vitamins or the finer points of minerals; it was just calories and protein. Then, too, the younger men have been exposed to a very confusing developmental situation. Experts even today admit that they do not know exactly what vitamins do. A doctor must have things down pretty well in figures to have confidence in a drug. The progress in vitamin development has been so fast—like the progress of our army in France. It has shot out in all directions, particularly since 1938. Much has been left undetermined by this race to discover new vitamins. Often in a few months a new vitamin has been found not to exist or to duplicate another. No wonder the poor doctor begins to lose faith. Nor has commercial advertising helped this situation one bit. Advertisers have just exploited the situation. No matter what word it was that the scientist either spoke or printed, if it sounded good, the advertiser picked it up and spread it far and wide further to confuse the buying public.

Most doctors do not deal with dietary deficiency states. In the South they do see some deficiency states in their florid existence, but in the North they do not, and they begin to wonder about these things that are talked about but never seen. For example, with regard to vitamin C, which presumably is the best understood of any of the vitamins. We can measure vitamin C readily and accurately. We should know at about what level scurvy will develop; and yet, by doing blood determinations upon numbers of patients in various sections of the country, we find blood levels of vitamin C that are in the range where scurvy should exist and yet there is no scurvy. Apparently there are so many other factors that we do not quite have under control as yet that you cannot depend on a vitamin C determination.

One more reason why the doctor is somewhat disillusioned about nutrition. Much is said about the deficiency states; and, while it seemed that signs and symptoms specific for various deficiency states would be developed, it soon became apparent that these findings were not specific for a particular vitamin deficiency. And, of course, the doctor was disillusioned, and he wondered if nutritionists knew what they were talking about. Nutritionists have had to retract some statements, particularly about the deficiency signs, and for those reasons the doctor is going to stand by now and just wait.

Then there are the benefits to be accrued from optimal nutrition, affecting the race—the vigor, mental and physical, of the race throughout the years. The doctor, with his past experience, is somewhat skeptical. He views the vitamins, perhaps also because there is such a popular demand for them, very cautiously. When they first came up, they seemed to have a great future. People tried them on everything, and for that reason they came somewhat into disrepute, although they do have a place.

Now the proteins are looming up. They are complex and confusing. What does the average doctor know about amino acids? As with the vitamins, so with the amino acids; they must be brought down to common, simple, ordinary 1, 2, 3, everyday terms to have them get across to the average doctor so that he will use them every day.

ARTHUR C. BUNCE (Federal Reserve Board): Can a person take too many vitamins? Do they have any detrimental effect if taken in too large quantities?

ANCEL KEYS (director, Laboratory of Physiological Hygiene, University of Minnesota): Vitamins in general are not toxic; that they are perfectly safe has had an enormous effect on the general psychology of both professional groups and of the general public. It is possible to produce toxic signs with a few of the vitamins, but enormous doses are required. But we know nothing whatsoever about the possible influence of high-vitamin dosage on the degenerative diseases and on metabolic diseases.

A. J. CARLSON (University of Chicago): The doctor in the last forty years was no more woefully deficient in nutrition than in any other field. In our training of between five and six thousand physicians in the last forty years, we have given as much attention to nutrition as current knowledge and the time permitted.

What is the doctor going to do when the patient comes in, convinced by the radio, newspaper advertising, and the drugstore signs that all his ills can be cured by these vitamins? The honest and efficient doctor is up against it in this unwarranted propaganda on a commercial basis for vitamins. Forty and fifty years ago there appeared a whole page in a New York Sunday newspaper wherein every ailment that today is ascribed to vitamin deficiencies, including tuberculosis, "weak women," and "weak men" (whatever that means), was cured by Duffy's Pure Malt Whiskey.

W. H. NICHOLLS (Iowa State College): Many doctors probably quite subconsciously play into the hands of the national advertisers in the particular brands that they recommend to their patients, for example, in the field of evaporated milk. Most doctors are probably not aware of the differences in cost of different brands of food. What effort has the A.M.A. made to put its official seal of approval on particular brands of food which are of good quality but which are lower in cost than the more expensive, nationally advertised brands?

MR. ANDERSON: The A.M.A. puts its seal on any food (we don't even know the cost of the food) which meets its standards of production, merchandising, and advertising. Many milks are adding vitamin D now, and almost every one in the country wants to show the seal. Carnation and Pet milks make a great appeal to the physicians through advertising in the scientific journals. They go to the doctor in his office. They leave him samples. They leave samples in the hospitals to feed all the babies before they go home. Then the mother gets a can of that milk to take home, and they say to her, "This is what we have been feeding the baby," and she thinks it is a good idea to continue.

MR. NICHOLLS: The way the Steenbock patent was originally handled by the University of Wisconsin, limiting its patent rights to a few of the large national advertisers, did not serve the best social interests.

MR. BLACK: How many of the doctors to whom patients go are equipped to diagnose vitamin deficiencies, to perform the ordinary tests that are sometimes performed in clinics?

COLONEL JOHN B. YOUMANS, M.C. (director, Nutrition Division, Preventive Medicine Service, Surgeon General's Office, Army Service Forces): If there are any clinical physical signs, any doctor worthy of the name should be able to detect even relatively early nutritional deficiencies. That "early" will vary somewhat with the nutrient in question. The X-ray for scurvy and for rickets and simple tests of vitamin C excretion in the urine can be done very easily. More complex tests, such as those involving blood levels, are perfectly within the realm of any well-equipped hospital laboratory. The equipment and ability of hospital laboratories vary, and some hospitals will not provide that service.

With regard to the larger problem of the recommended allowances and the attitude of the physician, from many points of view the strong points in their favor are their weakness. Because they have been put out by authorities, because they have been given careful consideration, because they represent the result of much laborious work, they deserve and they have received wide acceptance but have been used too strictly as yardsticks to determine what people must have, without paying heed to the reservation. There are individual variations, and these are highly important. These are lost sight of, and it is in this that they suffer from misuse to the greatest extent.

One of the weakest points in the procedure of preparing them was the fact that they were arrived at by a democratic process. It is to be doubted whether any scientific question should be settled on the basis of a democratic process. In Tennessee that produced the anti-evolution bill and the Scopes trial. Then there is the matter of definitions. For example, what is "saturation"? Saturation is a pretty definite chemical term. It means all that can be held (barring supersaturation).

Therefore it is confusing to speak of saturation in referring to varying amounts of a substance in the body. There is difficulty also in the concept of "minimum nutrition" or "minimum nutritional standards." Nutritional deficiency diseases may be defined as that state in which a lack of nutrients or improper nutrition first produces morphological or functional changes in the body. If that is true, anything from that level downward is disease, and anything above this is just unnecessary.

We also have unsettled questions as to what will happen if we get completely good nutrition. Children will grow larger and faster, and if they grow larger and faster, they need more food. So that there is no absolute, final answer to some of those questions.

Mr. Black: A good deal of the difficulty is one of semantics, arising out of the word "required." Probably, in fact, one has something in the nature of diminishing function here, as in the case of feeding generally: additional increments of feed give additional increments of growth, but at a declining rate. Just where one reaches the absolute maximum—the point beyond which no further growth occurs—has not been ascertained in the case of some of the proteins. With all these uncertainties we are not in a position to call anything *re-*

quired. Some wanted to call these "requirements." If you do, you must say "requirements for what?" Is it the requirement to prevent a deficiency symptom or to secure optimum growth? Until we know a lot more about nutrition than we do now, we have to be content with calling these "recommended allowances" and when we talk about them to avoid, *so far as possible*, using the word "requirement" or the word "adequate." The Food and Nutrition Board was extremely well advised in calling these "recommended allowances," and they should stick rigorously to calling them that and nothing more until we know much more than we do now.

MR. LINDBERG: In evaluating the adequacy of actual diets, it is obviously necessary to have reference to some standard table. Frequently the recommended allowances have been used in a rather mechanical sense. It is known that they are, on the whole, on the generous side; it is easy to get a too pessimistic picture of the situation when actual diets are evaluated on their bases. These tables would serve their purpose better if, instead of giving only one figure for each element, a range of the critical area were stated.

MISS ROBERTS: There has been much discussion in the board as to whether we would have a range. It has been the consensus of the board that a range was more confusing; that we would very much rather have one figure which was supposed to be somewhere around the mid-point, with the assumption that people could go above that or below that. For calories we did put in at least three levels, but for everything else we left it in one absolute figure. We also had considerable discussion about minima and optima, and it was agreed that if we really knew what the minimum was, we would know what the optimum was because minimum should be the minimum needed to protect every body tissue and some of those we don't know; and that is the main reason for giving a little leeway above the amounts that will actually prevent signs of deficiency disease, because many research workers believe that there are tissue changes long before they are obvious outwardly, and therefore a little leeway on the generous side should be provided. We have been rather distressed to see some publications in which the authors have claimed that a whole population is undernourished because they fell a little below the recommended allowances. Others, however, have used them much more sanely. They have expressed their findings in percentages of these allowances. Anyone can then judge for himself the adequacy. If people do not come to within 50 per cent, as some studies have shown, then it might indicate that they were in the danger zone; but if they come to nearly 100 per cent one would not say that there was any real indication of undernutrition.

MR. BUNCE: The idea that a central figure is better than a range may be questioned. Some elements may have a wide range and other elements a narrow range. If so, can we place these elements in any order of priority?

MR. GRIGGS: The Quartermaster Corps, in asking the Food and Nutrition Board to define compositions of foods, specifically directed the board to eliminate all ranges of compositions of food because they have to order, they have to buy their food, and, whether it is right or not, they have not found it possible in practice to use ranges.

MR. BLACK: This difficulty would be met if there could be combined with the recommended daily allowances a statement that, for this food element, 7 per cent is reasonably safe; for another, 8 per cent; for another one, 9 per cent; etc. This would have the effect of giving the range without changing the allowances.

MR. ANDERSON: In connection with maximal and minimal values there has been no mention of the Food and Drug Administration's minimum daily requirement tables. In advertising and labeling on packages, those figures are actually followed, for one reads on a package, "This food supplies one-third of the daily requirement of so-and-so."

MISS ROBERTS: The Food and Drug tables were set up before the board did its work. The Food and Drug standards were done by a few people and on a less complete survey of the evidence. They continue to be used, however, because they have been testified to before the Food and Drug Administration and they have been officially adopted. We took them into consideration, but in our judgment they were not consistent.

MR. ANDERSON: It makes a confusing situation for the public because they get those figures offered to them in advertising.

MR. CARLSON: It is a matter of the lesser of two evils. If the Food and Drug Administration did not have any such approximate figures, the manufacturers would lie ad infinitum.

MR. GRIGGS: It should be remembered that the Food and Drug figures are set up in accordance with the specific wording of the law which was passed long before these things became well definable, and it may be added that the Food and Nutrition Board has resisted very considerable pressure from the Food and Drug Administration itself to specify minimum requirements.

MR. TWENTYMAN: The Food and Drug statement presumably was the work of a body of administrators advised by the best scientific advice that was available to them at the time. If that is so, it is a first principle of administration—at any rate a wise administration—that in regard to any problem that presents itself in the field of public policy you have to take a view, you have to decide something; even if you decide to do nothing, you are deciding something. The scientist should realize that the administrator (and, after all, the work of the scientist can never be very effective unless the administrator does something about it, including the doctor) can act only upon what advice is available to him; but he should know what are the limits of its applicability, and he should also, in applying it, if he does decide to apply it, hedge to the extent of requiring that the people who have advised him should from time to time be prepared to come forward and say that they have thought a little more about this and that they think in this way or that way modification should be made.

MISS ROBERTS: The committee is in the process of reconsidering the recommended allowances now with a view to revision, and we have had one long all-day session of a group of experts to discuss them, and then we have had a discussion by the board for the B vitamins particularly, and we shall have more meetings within the year. You may be interested to know, though, that instead of welcoming a revision, almost everybody says, "Don't touch them! We've got them all in our books now, and we have been doing everything according to them, so leave them alone." Many individuals are not welcoming the revision as much as we had hoped they would.

MR. KEYS: It appears that there are many persons in this country who are putting more and more obvious chips on the shoulder as a natural reaction to what they consider to be coercion; the power of government being put behind some of these nutritional arguments has caused resentment. This is the case in certain sectors of the medical profession and among some scientists. The overemphasis of governmental agencies in promoting the use of nutritional tables and allowing commercial advertisers to misuse the material will react to the detriment of the general cause of nutrition.

We should *like* to approach this question of vitamin requirements in somewhat the same manner as the physicist in setting up the International Critical Tables. That is an ideal goal for which we should all strive. Yet there is the fact that at the present time we have nutritional problems of a very real and down-to-earth nature in this country and to a greater extent abroad, and we are going to have to be more involved in the practical solution of those problems. Therefore, administrators who have to answer some of these questions, who have to make decisions, turn and say to the nutritionists, "All right. Give us an answer."

We all know perfectly well that if we dropped down and took one-third of the total food allowance, if we took one-third of the total calories, we would soon be in pretty bad shape; if we took one-third of the total protein we could probably get along for a much longer period of time, other things being equal. When we get to vitamin C (ascorbic acid) we already have the example of extensive studies in Sweden, Great Britain, and South Africa to indicate that we could probably go on indefinitely on 25 mg., and very few people—if any—would develop scurvy, but it might not be the best thing for them. So there are certainly differences in the extent to which you can reduce on this scale. Further, there are differences in the rate at which deterioration might occur. We should like to talk about nutrition for a lifetime or, as Dr. Sherman talks nowadays, about a number of generations. In the meantime, however, we may have to answer questions about nutrition for the next couple of months or next couple of weeks or perhaps the next year or so. In that case, we would certainly say that you cannot go down as far in thiamine as you can in vitamin A. There is no question about it. You can coast on vitamin A stores for a vastly longer time than on thiamine. We have recently shown in our own laboratory that persons who are nourished at a level slightly higher than these recommendations with thiamine will come down with acute fulminating beriberi in about three weeks if they get no thiamine at all. On the other hand, we know from the studies of Dr. George Wald and others that a person previously well nourished in vitamin A can go along for many months on a zero intake without any signs whatsoever.

MR. BLACK: If any agency having a specific problem in nutrition will describe it and put it up to the Food and Nutrition Board, it will make an answer, just as it did to the Army when it presented a specific problem.

Mr. Griggs: The National Research Council and its parent-body, the National Academy of Sciences, was specifically set up by the government for the purpose of answering specific questions of this sort which the government might submit. The board and the academy have always been glad to furnish information to nongovernmental agencies so far as was compatible with the limitations of time and resources.

PART IV

FOOD SUPPLIES

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THE MARRIAGE OF NUTRITION AND AGRICULTURE

By KARL BRANDT[1]

IN SPITE of its gay symbolism, the title of this essay sounds theoretical and abstract, quite in contrast to what those who coined and first used the slogan meant by it, because as hard-headed realists they wanted something concrete and tangible. Australia's famous Scotsman, F. L. McDougall, one of the leaders of his country's agriculture and adviser to his government, saw in the late twenties and early thirties of this century how the farmers were struggling with unexportable surpluses and glutted markets. He also saw that the main remedy sought in the exporting countries consisted of production restriction or hoarding of surpluses in oversized granaries and in attempts to keep the prices of foods up. He felt that, although this policy was adopted not only in Australia but in many other exporting countries including our own, it was wrong, because he knew that, while in some countries food production was being curtailed on the farms by overhead planning, there were uncounted millions of people in other countries who suffered from a shortage of food and particularly shortages of the right kinds of food.

Observation of this paradoxical situation prompted Mr. McDougall and many other men of vision and public responsibility from different countries to take the initiative in seeking a more sensible and intelligent solution of the dilemma. They campaigned for an international program which would attempt to utilize the full capacity of food production of the world's agriculture for the purpose of improving the nutrition of people in all nations and, first of all, in the more advanced ones in the Western world.

LESSONS OF WORLD WAR I

World War I brought the almost forgotten specter of famine back to the Western nations. Food rationing was introduced experimentally, and all governments, belligerent and neutral alike, had to deal with a war-born scarcity of food. Nation-wide planning and central administration of the food economy were attempted for the first time in modern history. But in the absence of any scientific basis for food planning, only broad general reductions were made in habitual diets. All nations coping with the food problem discovered how inadequate was their knowledge concerning even the most elementary facts about food consumption and supply and how ill-prepared everyone was to answer the question: What are the minimum requirements of nutrition for people of varying age, physical stature, types of work, and living conditions? This public experience exerted a powerful and salutary influence. It stimulated social and natural scientists to investigate more closely all phases of the food economy, beginning with the farm and ending with the consumer's kitchen, and to do more research on the physiological requirements of food as they were related to health and well-being.[2]

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[1] Economist, Food Research Institute, Stanford University.

During World War I and immediately after, the belief was common among scholars and statesmen that Malthus' doctrine was still valid and that, owing to the progressive propagation of man, scarcity of food was not only inevitable in the long run but characteristic also for the second quarter of the twentieth century. A few years after the war the situation in the world market contradicted those assumptions. The war had fostered rapid progress in farm technology. It brought the internal-combustion engine into general use for agriculture, first in America and later elsewhere. The truck, tractor, and combine were some of the machines in which it was applied. Millions of horses were replaced, and millions of feed acres were released for food production. Enormous savings in manpower and in production costs became possible. New varieties of plants made available for crop production many areas that previously could be used only for scanty grazing. Research in animal nutrition and genetics also led to much greater efficiency in converting feed into animal products. The really revolutionary progress in food-production technology revealed the economic fallacy of the more than century-old secular "law of diminishing returns," as commonly applied to food production.[3] It became apparent that technological progress made increasing economic returns and a lowering of the costs of food production possible within sufficiently wide boundaries.

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[2] Perhaps it is worth mentioning that, first among all countries, the United States began in 1917, through what was later called the Bureau of Agricultural Economics, to organize research on the market for agricultural products. Up to that time agricultural economics was chiefly concerned with problems of agricultural production, tenure, and debt. Even the statistical penetration of the complex markets for the chief food products was in its infancy.

The Malthusian doctrine became still less applicable because of the change in the response of people to increased food supplies. During its earlier phases the process of industrialization and urbanization had been accompanied by an extraordinary population growth in the Western nations. Between 1800 and 1900 Europe's population increased from 190 to 400 million and sent additional millions of emigrants to other continents. However, toward the end of the last century, the birth rate began to fall in the most advanced industrial countries, while mortality continued to decline at a more rapid pace. Today the growth of the population in western Europe and the United States continues to fall, with the result that, with increased efficiency in agriculture, more food tends to become available from domestic and foreign sources than the nations with the greatest per capita purchasing power are willing to consume. The larger proportion of the world's population still lives under conditions which seem to bear out Malthus' doctrine because of general poverty; primitive utilization and management of natural resources, capital, and manpower; inadequate education and research; and unrestrained reproduction. However, even for them the application of modern agricultural production and food-processing techniques promises to expand the per capita food allowance considerably.[4]

Public experience in many countries during World War I with the attempt to organize and control the food economy and the need to administer food relief to hungry Europeans carried the newly aroused interest forward into the work of the League of Nations and its Health Organization. This received a fresh impetus in the middle thirties. Under the leadership of scholars from various nations, particularly the United States and Great Britain, the League's Mixed Committee in the field of nutrition began in 1935 to study the health, agricultural, and economic aspects of food and nutrition. In 1936 another great Scotsman, Sir John Orr, director of the Rowett Research Institute, published his path-breaking book, *Food, Health, and Income.* The League's Mixed Committee found that much malnutrition existed in the United States and Europe among the lower-income groups. It stated that in every country an appreciable portion of the population was not getting enough of the foods necessary for health and efficiency and pointed out how large a part of the workers' budgets was spent for food. From the work of the League's Mixed Committee of its Technical Commission on Nutrition and the coordinated efforts of the International Labour Office there stemmed a powerful new international food movement.

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[3] The fallacy consisted in drawing economic conclusions from the valid natural law concerning increasing and diminishing yield increments in response to a changing supply of growth factors in the life of plants and animals.

[4] The German geographer, Penck, several years ago published an appraisal of the food-carrying capacity of the earth. Assuming the full application of the presently existing agricultural production technology to the land resources of the world, he arrived at a food capacity of 13.5 billion people, or nearly six times the present world population. He added that further advancement of technology would further expand the capacity. This serious global appraisal for the longest run may simply give a hint of the potential leeway for action which the human race has created by its inventive genius.

Many countries conducted dietary surveys and began to develop devices to measure the adequacy or deficiency of diets. The League's Mixed Committee took the bold step of laying down optimum standards of nutrition. It had recommended the "conscious direction of the natural tendency toward better nutrition" and action by governments to make supplies of especially protective foods available at prices within the reach of all classes in the community, at the same time safeguarding the interests of producers. In other words, the League's Mixed Committee recommended the adoption of policies by the nations which would operate in the direction of a more harmonious marriage of nutrition and agriculture.

NUTRITION A WEAPON OF WAR

When World War II, which had been smoldering for years, finally broke out, the evidence accumulated about the inadequacy of the diet of large numbers of people in nearly all countries was conclusive and impressive. It was, indeed, so compelling that the general staffs of the aggressor nations utilized it with astounding effect in their economic preparations for war. The total planning for war included drafting a food-production, distribution, and rationing policy which made the utmost scientific use of existing resources for the sake of maximum efficiency of manpower and the maintenance, if not improvement, of public health. Military failure and dwindling economic resources upset and manhandled many of the preparations made in the Axis countries, particularly in Germany. But the remarkable fact remains that the full application of the latest knowledge on nutrition and health made it possible for Germany to keep civilians, to say nothing of the armed forces, for five long years physically far better fit than the best experts of the United Nations considered possible or than circumstances seemed to warrant. A well-conceived and competently executed war food policy made it possible for Germany to survive for almost five years a most stringent blockade without a collapse of civilian nutrition and morale. It seems noteworthy also that our other tenacious enemy, Japan, has obviously taken full advantage of the progress in nutritional research in other countries, as well as her own, in shaping the diet and the various combat and emergency rations for her troops.

Of the victorious powers, Great Britain has succeeded best in utilizing the international capital of the knowledge about food and health that had accrued during the interwar period. Under the impact of the serious German counterblockade and the necessity for food rationing, the British government has established very progressive food policies. All told, in times of scarcity, these policies have succeeded in distributing food more adequately among people of different incomes. With a substantial curtailment of the traditionally high ingestion of meat, they have redirected the composition of the diet for the laboring class, and particularly the most vulnerable consumer groups, toward a better-balanced diet with a sufficient safety margin in protective elements. All available evidence supports the assertion by British health authorities that, despite the changes in the diet forced by the necessity of war, the people in Great Britain enjoy better health than ever before. While the German food policy has tried to maintain a diet that serves war purposes, the British have utilized the emergency for some peacetime improvements contemplated long before.

That it is possible under conditions of long years of national emergency to improve the diet and the health has a most promising aspect, but it also has implications which are very disturbing from the agricultural angle. If it is possible to improve national diets with less of the most costly items available, the specter of large and pressing food surpluses becomes so much the more ominous.

During the war the interest in the relations between agricultural production, nutrition, and health received a powerful new invigorating impetus. Again the war has made people everywhere on the globe very food-conscious, even in countries like the United States where food supplies are relatively secure. The war has not interrupted the continuance of the trend in the international food movement but has deepened and widened the thought behind it and given it more popular support. This holds out the promise that much progress can be made toward abolishing both "hollow" and "hidden" hunger, provided that the good intentions are carried out with realism and sagacity. Great waves of enthusiasm and public optimism do not necessarily advance the cause of nutrition of the living people.

To keep our feet well on the ground we ought to realize that nutrition and agriculture have been closely related to each other and that progress in both has functioned in a complex pattern wherein both of them have oscillated between positions of cause and of effect. The moving agricultural frontier combined with improved transportation and distribution facilities has brought prices of costly foods down and within reach of low-income groups and has made the food available over longer periods of the year. Shifting consumer preference has, on the other hand, put such a premium on the expansion of other foods that the initiative came from the receiving end.

The Mixed Committee of the League of Nations stated particularly that it considered it as "surprising that agricultural systems were able to adjust themselves as well as they have done; and that they have been able to reorientate production along lines which permitted the notable improvement in nutritional levels recorded to be accomplished."

POLICIES FOR IMPROVED NUTRITION

Under Anglo-American leadership, the United Nations have taken the lead in establishing the proper international institutions and in working out procedures which will enable them to co-ordinate the performance of agriculture and the advancement of public health through better nutrition after the war. Their conference at Hot Springs on food and agriculture, in May and June, 1943, was a milestone on the road to international co-operation to avoid famine and deficiency diseases. The representatives of forty-four nations agreed that the actual state of health was deplorable and that a great opportunity to improve the situation by appropriate national and international policies was at hand. The *Final Act* of the conference defined the defects in the production, distribution, and consumption of food in different countries and made specific recommendations about how improvements could be made. One of the most important recommendations adopted at Hot Springs, however, concerned the establishment of an interim commission and a permanent organization on food and agriculture. During the thirteen months since Hot

Springs the Interim Commission has done its work. The United Nations Food and Agriculture Organization, or F.A.O., has received its constitution, is in process of being inaugurated, and may start its work soon. A wise and cautious course for its functions has been set forth in the Hot Springs recommendations and a noble and high goal been fixed. A very promising and encouraging beginning has, therefore, been made in a world-wide effort to develop better knowledge and methods through which agriculture can be mobilized and directed toward more efficient service in the cause of health and nutrition.

The legitimate and most pertinent questions which everyone interested in some angle of the broad complex problem of agriculture, food, and health will raise are, of course: What are the possible directions for agricultural adjustment which the nations have to shape for executing the policies, domestically and internationally? To what extent and at what rate can success reasonably be expected?

Today the most advanced agricultural exporting countries have a greater productive capacity at their disposal than in the last phase of World War I or in the twenties. That capacity exceeds not only the optimal effective peacetime domestic demand which can be expected, but will exceed also the ordinary peacetime demand in the world market as soon as the importing countries have restored their production. At the same time, in the less developed agricultural countries where farms are overpopulated, human labor in agriculture is so unproductive and poverty so prevalent in consequence that dire underfeeding is widespread among the rural population. The latter situation is typical of eastern and southeastern Europe and most of Asia, but large parts of Africa and Central and South America are not free from it. It may sound paradoxical; yet, in spite of the surplus capacity to produce in some of the leading exporting countries in which agriculture is modernized—including Argentina, Canada, Australia, New Zealand, and, last but not least, the United States—and the tendency of that capacity to increase after this war, agricultural production in the overpopulated peasant countries must be improved.

In no other way can nutritional conditions, which in many of those countries are deplorable, be ameliorated. The potential surplus production of the advanced exporting countries is large only in proportion to the customary markets in countries with sufficient purchasing power. For the most part, these markets are in Great Britain and the few industrially advanced nations in western Europe and to a small extent in a few Central and South American countries. The surpluses would fade out immediately if the effort were made to direct them toward the major part of the world population which still lives the life of poor peasants. Unfortunately, they must develop purchasing power first. It is still, as in former times, unfeasible and impractical to improve the lot of nations as well as individuals merely by gifts. Gifts may actually pauperize the recipients. The road to diminution of poverty still leads by way of improvement of man's productivity.

There is a great deal of discussion of the immense uncontrolled fertility of people in the precapitalistic state of society and its pressure on food supplies. It is pointed out that these nations must learn to restrain their reproduction. It seems most doubtful whether this amounts to more than marginal notes on the pages of history, and it will stir resentment among the nations concerned. Western nations have not restrained their reproduction by any sort of policy. Such restraint has come about inadvertently through changes in the social and economic pattern of life and in standards of wants under progressive urbanization. To expect people to begin their progress with the last adaptation to an advanced degree of urban living seems to lean slightly toward the side of optimism. Heavy pressure of population upon increased food supplies in those parts of the world must be taken for granted. All the more important must become the development of industries in those parts of the world.

The people in Poland, Rumania, Bulgaria, in Thailand, Burma, India, and China, for example, will be in a position to consume more food and more of the proper kind of food and enough food throughout the years, once they advance toward a position of increasing the output of their work sufficiently to have more for themselves and enough to sell, so they can buy the most vital goods and services they need. To relieve the pressure of too many people on too little land with too few tools and implements requires that other occupations be opened up. Industrialization offers the opportunity of improving the ratio between agricultural resources and manpower. It increases the productivity of the people who are drained off from agriculture and with rising purchasing power creates an increasing market for agricultural products. This is as true for the overpopulated and ill-equipped farms in our southern United States as it is for the southeast of Europe or for India. The most vital condition for the successful marriage of agriculture and nutrition is a world economy which expands at a wholesome pace, particularly in the least-advanced countries.

The primary task of co-ordinating agriculture and nutrition is one that must be solved by every nation on the basis of what it can best produce from its own resources.[5] Such economic progress improves the real income of the people and thereby puts them in a position where they can improve their diet. As the dietary trends in many countries prove beyond doubt, the rise in income has resulted, in the main, in shifts in the right direction so far as health and physical and mental fitness and performance are concerned.

Outstanding progress has been made in the last three decades in the sciences dealing with nutrition and the gradually accruing set of measurable specific minimum requirements of a balanced diet. It is therefore becoming possible to set nutritional goals for whole nations. Those goals will not and must not say how much the nation or the individual must eat of any specific food commodity. The optimum or minimum set as a standard will show the quantitative requirements in calories, proteins, carbohydrates, and fats, in vitamins and minerals. For the guidance of the public the standard may be interpreted in terms of quantities of groups of foods which will fill the requirements in nutrients. It is not necessary or to be expected that the housewife should ever calculate in terms of calories, protein, carbohydrate ratios, or units of vitamins. She will do much better to follow simple rules for a balanced menu and concentrate on the art of a good cuisine. Dietitians and cooks in many an American hospital compose menus which are perfectly balanced and in line with optimum nutritional requirements, but, since the subtle art of good cooking is not added, the patient's palate and the frustration of his culinary expectations sabotage the gain made by science.

If our nutritionists want to clear the decks for a real educational campaign to win the people for their and our great common cause, they ought to launch two campaigns. One would aim at a broad popularization of that part of the new knowledge which is ready for application in such language and with such practical rules that every person of average intelligence can grasp it. This campaign should take the important task out of the hands of those publicity quacks who confuse and exploit the public. The other action should aim at legislation which, as the Pure Food and Drug Act prohibits adulteration, in this case would penalize the adulteration of nutritional information by distorted advertising claims.

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[5] Fortunately enough, diets can be lifted above the danger line of nutrient content on very different levels of costs and with a still wider selection of items in the menu. The typical Anglo-American diet is only one type among many, and there is no visible reason why it should apply to other nations. It is based on the use of an abundance of land. Many nations cannot afford such diets yet can attain medically safe diets on the basis of their resources, which may or may not be supplemented by foreign trade.

The importance of the existing minimum and optimum dietary standards, such as the one issued by the Food and Nutrition Board of the National Research Council, lies in the fact that they offer a useful tool for checking agricultural-production goals relative to the protection of public health. So far, agricultural administrators are still exploring the utility of this new tool. No drastic change in planning procedures is to be expected but, instead, a gradual refinement in planning techniques.

Yet food in the future will be purchased by the people who consume it. Thus improvement in health through better nutrition must essentially come through educational processes. Frequently those who need a better diet most are the most wasteful buyers and users of food, because of ignorance about it. Yet if an optimum of progress in education should be attained, the decision about how much of any one food commodity the farmers can sell in the domestic market will be decided by the purchases of the consumers. This volume would reach its optimum when all the consumers not only had a sufficient income but also devoted a sufficient proportion of that income to the purchases of the proper kinds of food. The total demand could be satisfied if agricultural production of the proper amounts flowed into the reservoirs of commerce from which the flow goes into the kitchens. It is obvious that there is a wide margin for decision and error alike on the side both of the consumer and of the farmer. It seems justified, however, to say that the greater error or slip in the machine lies not in agriculture but in the orders for production issued by the sovereign consumers or in the distortion of such orders through public interference in the price system in behalf of farm income.

Farmers all over the world, highly skilled and educated ones as well as their illiterate colleagues, obey the order of prices; the latter obey less precisely and quickly, but they, too, respond.

Nutrition policies, therefore, must be translated into and supplemented by proper expression of the consumer's real dietary needs plus his preferences within the wide margin available in the language of farm prices of food. Thus the most glorious and truly great victories of our scientists at their retorts, microscopes, and test-animal cages will remain still in the intellectual realm of a few unless we succeed in passing the practically applicable rules to the housewives, cooks, and chefs. Enough energy has not been allocated to this task.

During the last twenty years, and particularly during this war, much progress has been made in developing public institutions and services to reduce the margin of error between the market demand and farm production. Our agricultural-production planning and estimation of the demand has become more and more efficient. We have also adopted policies of holding large public stocks in order to create a sufficient buffer between production and demand, although we have not yet learned to handle them very efficiently. It is our misfortune that our public programs concerning agriculture as well as nutrition are primarily adopted by the legislative branch of our government under the effective pressure of organized economic-interest groups, mostly by way of compromise in the tug of war between several groups. This situation reveals very disquieting developments in the processes of government in our democracy, similar to the ones that had such tragic effects in other countries. If the representatives of the people have so little real statesmanship that they represent only selfish group interests and can think only in terms of bargaining on national policy issues, no sound objective policy can emerge.

In connection with this observation, it may be pointed out that neither our margarine tax legislation nor many interstate trade barriers are compatible with a policy of mustering our agricultural production for the greatest progress in nutrition.

REVISION OF FARM POLICY ESSENTIAL

Most of our policies in the interwar period toward agriculture have been oriented toward the goal of securing a more adequate income for our farmers, protecting them against price deflation, and restricting competition. Whenever we have occasionally introduced into our agricultural policy some considerations of nutrition or public health, we have done so in making a virtue out of necessity. We promised the farmers better prices, supported the prices by filling public granaries until they overflowed, and then began to devise methods of surplus disposal, such as the food-stamp plan and the school lunch program. It certainly was a great step forward when, by considering the issue of food and public health, we shifted from thinking of farm relief toward thinking also of the consumer. At present there is under discussion the proposal to reverse the procedure by choosing the minimum dietary requirements of the people as the basis for all agricultural production and distribution planning. Some reconnoitering efforts in that direction are being made in the Bureau of Agricultural Economics, but thus far they have not led to anything tangible. It is suggested by some that we have to go one step further and subsidize consumption because lower-income groups are neither aware of their real needs for the proper food nor willing to allocate the necessary part of their income to such food. Such a policy is advocated as the most effective measure of marrying nutrition and agriculture. Some claim that to distribute selected types of food at public expense is the only feasible way of making full use of our agricultural-production resources and at the same time of improving the diet of the low-income groups.

This approach is one that tries to accomplish results quickly by administrative engineering and political expediency. An educational process will require more patience, but it will remedy causes instead of symptoms. Public feeding or free distribution of certain foods is least objectionable on grounds of a sound general policy if and when such action is an integral part of a broad educational endeavor toward better food habits and the people's knowledge and skill in taking care of their health. Public feeding is objectionable if it is applied merely as a palliative without such educational policy, because it shifts the emphasis in the wrong direction.

To make food of good quality and at fair prices available to workers in shops by proper recommendations and co-operation with private enterprise is one way. To buy it and distribute it free by a government agency is another.

While both may accomplish similar results as to the ingestion of food by the workers, the by-products in government, the attitude of the people, and the repercussions in the economic system as a whole may be very different. Eternal vigilance requires that we try to accomplish better nutrition without sacrificing the good society by too readily adopting short-cut methods which are all based on the premise that not only are many people not acting intelligently enough and are delinquent but that they will always remain that way and therefore must be publicly fed.

The greatest obstacle to better co-ordination between agriculture and nutrition lies in the particular method which our Congress has chosen in recent years to guarantee the farmer a satisfactory income.

We do this by fixing prices in the market at a certain level and uphold this level even when two successive bumper crops overflow the granaries. Naturally, consumption cannot respond fully to the abundance nor can utilization or processing or production. To foster an optimum nutrition requires, moreover, energetic efforts at better education and the availability of food at the most reasonable prices attainable. Lowering costs of production and greater economy require the operation of effective competition between producers as well as public services in information and guidance of farmers.

To guarantee farm incomes through the medium of guaranteed market prices thwarts the adjustments which lead to the greatest economy in all phases of the food realm. To co-ordinate nutrition and agriculture more closely, our farm policy must be revised. Taking as a fact the strong popular support for the farmer's public protection and powerful political representation, the revision of our farm policy has little other choice than to guarantee a certain minimum income. However, the income floor must lie at or below the equilibrium point for the more efficient producers; in other words, it must be low enough to be actually only an insurance against serious emergency. Such a policy can be executed by guaranteeing a minimum return, for example, for a bushel of wheat for a certain production goal so that the farmer can sell at whatever price he can get, and at the end of the year receive the difference from the government. If the wheat-growers overshoot the goal, the deficiency payment they receive adds less and less to the return per bushel actually sold, the more they exceed the guaranteed volume. Thus the income guaranty neither paralyzes the competition among producers nor does it subsidize an unlimited expansion of production. As long as market prices stay above the floor, no deficiency payments are due. As in every sort of public protection of a minimum income, the moot point for this course remains whether the legislative branch of the government will set the income floor low enough to avoid a distortion in the allocation of productive resources.

However, aside from this danger, which is characteristic of any delegation of power for economic intervention to political authorities, the suggested course of policy involves a most complex process of planning, which requires extraordinary competence in the proper branches of the civil service. To guarantee a minimum income in the form of deficiency payments for commodities necessitates decisions about the proper relations between the income floors of different commodities and the possibility of making adjustments when needed. Many more complications are involved. These hints may indicate that the best that can be claimed for such a revision of our farm income policy is that it is a lesser evil. It would not only limit to a minimum the scope of governmental intervention in the market and on the farm, but it would maximize the domestic demand for food and fiber and would also enable American agriculture to maintain its share in the foreign market and thereby contribute to the improvement in the diet of other nations. On the other hand, the government can effectively use the income guaranty for the purpose of steering and guiding production, because it can set the production goal as well as the guaranteed return for specific commodities.

If the present price-support policies are continued long enough, we may face a situation like that which defeated the Federal Farm Board. The present price policies are based on the assumption of gigantic food requirements for Europe. If this assumption should prove to be faulty, because Europe's agricultural production is either better maintained or recuperating faster than has been anticipated, it may happen that the price-support system will collapse. If that is to be avoided, a very drastic change in policy needs to be adopted. The notion that a continuation of American Lend-Lease during the coming peace will offer a convenient vehicle for unloading in other countries vast amounts of food as gifts can be dismissed as political fiction.

Intelligent co-ordination of the performance of agriculture and policies toward an improvement in nutrition definitely requires a consideration of the boundaries for the expansion of agricultural production. It is contrary to the principles of a well-balanced economy if, under political pressure, farming is made so profitable that a surplus of manpower and capital is allocated to food production in view of other needs. While we have some leeway for adjustments in the diet, it is very likely that, with fewer people on farms than we now have, we can produce more food than the people are going to absorb, even with subsidized consumption. Food subsidies on a large scale may become in the next decade the political expediency by which we pay a premium for maintaining an oversized farm population and an oversized agricultural-production capacity.

These skeptical statements merely stress the fact that not all agricultural policies which sail under the flag of nutrition are necessarily good. To quote from the report of the Mixed Committee again: "Nutrition policy does not involve a rapid transformation in the existing structure of national agricultural systems. The changes in demand which occur will of necessity be slow and gradual; the reorientation of production will be a long run and not a revolutionary process." This is a wise observation.

Yet American agricultural policy is at present in its methods of guaranteeing income far out of line with what the nutritional policy of the nation and the welfare of agriculture in the longer run demand.

While nutrition and agriculture have been married for a most respectable length of time, there is too much independence in thinking and use of prerogatives on the part of both partners. This tends to lead to friction and occasional disharmony. This state of affairs leaves wide opportunities for an improvement in understanding, better teamwork, and greater faithfulness.

FOOD SUPPLIES IN PROSPECT AFTER THE WAR

By WALTER W. WILCOX[1]

WHAT can consumers and producers expect in the way of world food production and supplies after this war? Has the war set in motion forces to change the outlook for per capita food supplies after the relief and rehabilitation period is over? What appears to be the probable relation of market supplies and demand for the various groups of foods?

For present purposes the answers to these questions will be limited to a brief summary of the forces making for changes in food supplies, an evaluation of the magnitude of the changes in supplies to be expected, and the relation of these developments to possible market surpluses in view of institutional forces influencing the demand for food. The prospective postwar food-supply situation can best be understood after (1) a review of the supply situation for each of the major categories of food and of the trends under way in the immediate pre-war period, (2) an analysis of the effect of the war on the supply of each of these groups of food and of the probable persistence of wartime changes in production techniques, and (3) an evaluation of the probable institutional framework within which postwar agriculture production and markets will be organized.

THE PRE-WAR FOOD SITUATION

World food production was increasing rapidly in the years immediately prior to the outbreak of World War II. Most of the increase occurred in the Americas and Europe, however, and was the result of two different sets of forces. Technological progress which involved substitution of mechanical for animal power, improved strains of seed, disease control, and increased use of fertilizer was important both in Europe and in the Americas. In addition, and fully as important, most European countries in their efforts to become more self-sufficient stimulated increased agricultural production by tariffs, subsidies, and price guaranties. With the exception of the U.S.S.R., relatively little of the increase in production resulted from bringing undeveloped farm land under cultivation either in Europe or in other parts of the world.

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Although the statistics are extremely unreliable, the increase in production of the staple foods in recent pre-war years appears to be smallest in the Orient, where the population has been increasing most rapidly.

This rapid increase in production in the Western world, together with continued unemployment and a restriction of imports in many countries, resulted in a number of surplus situations. In this country we were mostly concerned with the wheat and cotton surpluses. In fact, the world wheat situation became so acute that in 1942 the major exporting nations together with the United Kingdom, the major importing nation, joined in an international wheat agreement designed to permit a sharing of the market at agreed prices. In terms of the size of United States carry-overs the cotton situation was even worse, but other major cotton-producing countries were fairly well satisfied with world prices as long as the United States held a large part of her supply off the market. Negotiations between the major exporting and importing countries were in progress, however, at the time of the outbreak of the war, looking toward an international cotton-marketing agreement.

Sugar was under an international production-control agreement at the outset of war both because production had been expanding in the exporting countries and as a result of American, Canadian, and Continental European restrictions on imports. The surplus situation which existed in coffee during the interwar period is familiar to most people and needs only to be mentioned here.

At the outbreak of the war the prices of the common fats and oils were at exceedingly low levels—lard sold as low as 5 cents a pound at Chicago, soybean oil at 4.8 cents, and linseed oil at 9.0 cents. World production had been increasing more rapidly than consumer demand. The supply and price situation for fats and oils would have been even more unfavorable except for some war-anticipation purchases. Fats and oils were surely on the verge of being in a surplus situation at the outset of the war.

A review of pre-war food supplies would be incomplete without touching upon the United States picture for a number of other commodities. Both because of substantial unemployment and because of the absence of an export market at satisfactory prices, the government found it necessary to engage in price-supporting activities for a number of commodities. In addition to wheat and cotton, the most important of these were corn, butter, cheese, rice, peanuts, and many of the fruits. The excellent corn crops of 1937, 1938, and 1939 filled the ever normal corn granary to overflowing, and hog production reached such proportions that prices fell to very low levels. Without the influence of the war in increasing employment and purchasing power and the additional demands of Lend-Lease purchases, pork would surely have been in a difficult surplus position in another year or two.

PRE-WAR INCREASES IN UNITED STATES AGRICULTURAL PRODUCTION

Total agricultural production in the United States was increasing at the rate of about 1 per cent a year in the ten years just before the outbreak of the war. The accompanying official index figures of the United States Department of Agriculture reveal the trend in agricultural production for sale and for consumption in the home from 1912 to date. It is interesting to note that total agricultural production increased more during the seven years of A.A.A. programs restricting production than it did during the first World War. In fact, the increase in agricultural production in the thirties as recorded by this index was approximately the same as the increase in the twenties. Actually, production increased more rapidly in the decade of the thirties, for large supplies of feed grains were carried forward and have formed the basis of the large expansion in livestock production since 1941.

	Per Cent of 1935–39 Average		Per Cent of 1935–39 Average
1912–14 (pre–World War I)	83	1931–32 (pre–A.A.A. years)	98
1918–19 (World War I)	90	1939–40 (pre–World War II)	108
1920–21 (postwar)	88	1943–44 (World War II)	130

The substantial increase in total agricultural production during the period when the A.A.A. was actively attempting to hold down the production of the major crops took place partly as a result of the A.A.A. program and partly in spite of it. The major factors in this program tending to increase output were the payments for the performance of soil-conserving practices after 1936, the indirect encouragement given to the expansion of soybeans to replace corn and oat acreages, and the increase in farm income which stimulated the replacement of horses with tractors and the purchase and use of other production supplies such as fertilizer, improved strains of seed, and pesticides. While it is impossible to determine the level of production which would have been maintained without the A.A.A. program, the evidence seems to be fairly clear that the over-all restriction effect must have been moderate.

In concluding the review of the pre-war food supply situation, several things need emphasis. Production in Continental Europe was increasing, largely in response to government expansion programs. Production in United States was expanding, in spite of specific restriction programs, largely as a result of mechanization and other technological advances. In South America production of cotton, fruit, and several other commodities was expanding—partly to supply a world market from which the United States had withdrawn because of low prices and partly as a result of agriculture's becoming more commercialized. Canada's agriculture appeared to be standing still. Increases, in the Orient on a per capita basis were very small, but the U.S.S.R. was making substantial progress in increasing her food production. A trend of considerable significance was the more active interest taken in agricultural producers' incomes during the decade of the thirties by the governments in many countries. In some countries the government programs for specific commodities were of a price-support and production-restriction type, but in others the price-support programs were directed toward increasing production.

WARTIME CHANGES IN FOOD PRODUCTION

Data are available which present a picture of changes in food supplies as compared with pre-war supplies in thirty countries.[2] Food production for human consumption in these thirty countries in terms of calories was 7 per cent higher in 1942–43 than in the pre-war base period (usually 1935–39). When one considers that this estimate covers western Europe, free China, India, Japan, and the Middle East as well as those parts of the world not directly affected by the war, its significance becomes apparent.[3] This rate of increase of 1–1.4 per cent a year is more rapid than in the pre-war decade and exceeds the normal rate of population increase in these countries. The only two areas of the world to record decreases in production are western

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[2] This study by C. M. Purves, "Wartime Changes in World Food Production," is published by the Office of Foreign Agricultural Relations, U.S.D.A. The only important countries omitted are the U.S.S.R., countries of Eastern Europe such as Poland and Yugoslavia, occupied China, and the Pacific islands. No data were available for these countries.

[3] This increase of 7 per cent for the world as a whole, including Germany and occupied Europe (except Russia), is as large as the increase in production in the United States during the last war—a notable agricultural achievement.

Europe (including North Africa) and the Middle East. In both these areas the index of production is 95 per cent of the pre-war production. As might be expected, North America leads in the increase in calorie production with an expansion of 30 per cent over the pre-war standard, and South America is second with an increase of 17 per cent.

In the occupied and blockaded countries calorie consumption has been maintained by the production of increased quantities of cereals, potatoes, and other foods for direct human consumption, while livestock products have declined. During a war period we expect this type of shift in the production and diet. But the comprehensive picture for the thirty countries tells a different story. An increase in production was recorded for each of the major food groups in these thirty countries. The index for each group is as shown in the accompanying table.

Production in Percentage of Pre-war Production		Production in Percentage of Pre-war Production	
Cereals	106	Meat, poultry, and eggs	107
Fruits and vegetables	109	Dairy	101
Edible-oil crops	123		
Sugar crops	105	Total livestock	104
Total crops	107	Total crops and livestock	107

Increases in livestock production in North and South America and Australia have more than offset the declines in Europe. Fruits and vegetables have been increased in every area except the Middle East, with a 30 per cent increase in South America leading all countries in the expansion. Edible-oil crops, which show the greatest expansion of all the food groups, have almost tripled in South America. Here in the United States our greatest increases in production have been in our edible-oil crops, soybeans, and peanuts; and in 1943–44 the combined production of these crops was 62 per cent above prewar. The greatest percentage expansion in sugar crops (40 per cent) occurred in the Middle East, which has been isolated from the surplus sugar-producing areas of the world. Increases also occurred in North and South America and Asia.

The production of dairy products declined in such important areas as western Europe (in spite of increased production in the United Kingdom) and New Zealand. The Middle East also registered a decline. These reductions were more than offset by a 20 per cent increase in the United States, the four countries for which data are available in South America, and an 11 per cent increase in Canada.

GEOGRAPHY OF THE SHIFTS IN PRODUCTION

If one looks at the geography of the shifts in production arising out of the war, several things stand out. The United Kingdom has turned to Canada and the United States for that part of her animal proteins which formerly came from the European Continent or were produced on the British Isles from imported feeds. Both edible- and inedible-oilseed crops in North and South America have been expanded to offset the loss of palm and coconut oils from Japanese-controlled areas in the Pacific. Before the war, over 10 per cent of our fats and oils were imported from these areas, and around one-third of the world trade in fats and oils originated in this section of the world. The almost complete replacement of this loss is the outstanding achievement of farmers in North and South America. Every country for which statistics are available participated in the expansion of oil crops.

South American farmers had a far different experience than those in North America. Usual exports of corn, wheat, flax, and livestock feeds were dammed up for lack of shipping. This, together with the high level of demand for livestock products, stimulated an expansion of pork, dairy, and poultry production in addition to oilseed crops. Percentagewise, the increases in these products are large, although the total quantities involved are small.

WILL THE WARTIME SHIFTS CONTINUE?

In South America there is little tangible evidence of new long-time forces being set in motion by the war, although dairy and pork production may continue on an expanded scale and Brazil may have shifted away from coffee toward a more diversified economy. It would appear that increases in coffee production have been checked for the time being at least and that the stage is set for a moderate continued expansion in cotton, fruit, and livestock production.

The shortage of food imports in South and Central American countries during this war period has had a stimulating effect on home food production. Technological progress and the experience gained in growing increased acreages of oilseed crops, rice, and vegetables will no doubt be factors tending to keep the production of these crops above pre-war levels after the present war demands have subsided.

Most of the wartime shifts in European countries toward increased production of potatoes, oilseed, and cereal crops are emergency measures which will not be continued longer than necessary.

A part of the recent expansion in feed grains and much of the expansion in livestock products in Canada is likely to be permanent in view of the unsatisfactory outlook for wheat and the prospects for government price supports to be mentioned later. The United Kingdom is now in the process of making long-term contracts for some of the livestock products in Canada. This will be an important factor in stabilizing Canada's output of these products at her new high levels.

The current high level of production in the United States is in part temporary, resulting from the utilization of surplus feed grains and wheat stocks of earlier years, imports of feed grains, and unusually favorable crop years. Modern machinery has reduced weather hazards, however, and continued technological progress will permit further expansion of total output in spite of downward adjustments in the production of oilseeds, sugar beets, potatoes, dry beans, and peas.

The urgency of the need for food, the shortage of labor to produce it, and in some areas the destruction of draft animals and implements are powerful factors making for technological progress during and immediately following wars. This war is no exception, and we can expect technological progress to proceed at an accelerated rate in all countries.

The total supply and use of fertilizer has been restricted in Europe during the war, but it has been distributed in accordance with the requirements of the soil to a greater extent than ever before. In the United States, fertilizer use has increased by 50–100 per cent, and the fertilizer industry in both the United States and Europe is capable of a greater output than was utilized in pre-war years. Nitrogenous fertilizers in particular should be cheaper as a result of technological developments in nitrogen manufacture during the war. While the volume of fertilizers used will depend on agricultural prices, it seems probable that a large number of new fertilizer users have been developed during this war period, and we can expect a substantial increase in fertilizer use to carry over into the postwar period.

WARTIME CHANGES IN FOOD PROCESSING

Changes which have taken place in food processing during the war have implications of long-run significance to our available food supply. Three important innovations immediately come to mind: (1) dehydration of fruits and vegetables, (2) fortification and enrichment of cereal products, and (3) dehydration of milk and eggs. Each of these innovations may have a great influence not only on the competitive position of the different producing areas but also on the nutritive content of foods and their cost to the consumer. These innovations also affect the volume of production which can be moved into consumption at profitable prices.

Evidence regarding the consumer acceptance of dehydrated vegetables is conflicting. Unless further improvements are made in the quality of the product, it seems doubtful if dehydration will play more than a modest role in the processing and marketing of vegetables. Similar difficulties of consumer acceptance are encountered in the merchandising of dehydrated eggs. Dried fruits, on the other hand, were well established before the war, and improvements in dehydration have increased the competitive advantage of this method of processing and marketing a number of our common fruits.

The expansion of dehydration of milk is one of the phenomenal developments of the war. Before the war a large part of the product went into livestock feeds. The use of both dried skim milk and dried whole milk for human food has increased by several fold during the war. In this country before the war, whole-milk deliveries from the farm were increasing at the rate of about two billion pounds a year, and approximately forty billion pounds of whole milk were delivered from the farms in 1935–39. In 1944 United States farmers will deliver around sixty-three billion pounds, or an increase of over 50 per cent. Much of this additional whole milk was used in fluid form, but large quantities were dehydrated or used to make a combination of butter and dried skim milk. Reports from Europe indicate that a similar increase in whole-milk deliveries has taken place, although dehydration has not played such a prominent part in the utilization of the product. Assembly plants have been installed, delivery routes have been organized from the farm to the plant, and the producer has learned to carry on his livestock feeding operations without skim milk. If a reasonably profitable peacetime outlet can be found for the products, this wartime shift to the greater human utilization of milk solids not fat will be continued. Many people expect further technological and marketing developments which will increase the acceptability of the products and thus widen the market for the nonfat milk solids.

The wartime expansion of our synthetic vitamin production has been little short of phenomenal. The existence of this plant capacity and of new lower-cost production methods assures us the opportunity of extending the fortification of cereal products both in this country and in other parts of the world.

POSTWAR INSTITUTIONAL FRAMEWORK FOR AGRICULTURE

It is only by relating these potential upward trends in production to the probable governmental controls of marketing and distribution that one gets a picture of supplies in relation to probable demand.

The United States picture is already taking shape. Legislation is in effect requiring governmental support of many agricultural prices at 90 per cent of parity for two years after the close of the war. It may take two years to fill the European and Far Eastern demands created by the war, but at the present moment this seems doubtful. Unless a plan similar to Lend-Lease is continued or U.N.R.R.A.'s funds are increased to permit the shipment of food to the Orient on an unprecedented scale, it appears doubtful if present high wartime demands for food will continue beyond the first harvest after hostilities cease. The United States must have a substantial export demand as well as full (not partial) employment to move all the food she is capable of producing into consumption at 90 per cent of parity price levels. A revival of surplus marketing schemes is now being discussed in some circles as a necessary corollary to our present price-support legislation.

In Canada the price of wheat has been under government control for some time. Now she is in the process of setting up a new agricultural price-control board which will extend price-support measures after the war to all important agricultural products. This development is significant, for price-control measures are usually surplus-creating measures.

The existence of the international wheat agreement has already been mentioned. One hears reports regarding the necessity of broadening the protection of United Kingdom farmers and maintaining British agriculture in a more productive state than in the pre-war period. Similar requests for protection of home producers are being reported from most countries which have expanded production to offset losses of imports. It seems probable that many of these countries will take measures to support prices for their farmers, and they may create additional trade restrictions to limit competition. It is possible, of course, that the trend in the world will be to lower the restrictions on agricultural imports. Much depends on the nature of the trade, foreign exchange, and financing agreements associated with the peace arrangements. An elementary requirement of increased trade in agricultural products is the guaranty of security. With satisfactory assurances with respect to national security, some moderation of the pre-war protectionism can be expected in a number of countries. But we should not forget that the economic welfare of European farmers must be guarded by their governments, and it is unlikely that they will be able to devise extensive substitute schemes for tariff protection in the first few years after the war.

Increased demands for food and a reduction of the pressure of agricultural population are expected by some people to result from increased industrialization, particularly in the Orient and in South America. Two points are pertinent. The first is that industrialization is a continuous process, not likely to have a significant effect either on the demand for, or the supply of, food for several years. The second is the probability that agricultural countries like China, when undertaking to industrialize, will actually expand their agricultural exports and reduce their imports in order to obtain foreign exchange for the purchase of industrial equipment. World food surpluses actually may be aggravated in the early years by a rapid increase in industrialization in the predominantly agricultural countries. In summary, the present outlook regarding the postwar market for food indicates a continuation of most of the pre-war restrictions on trade and an emphasis on price supports to producers as the primary method of assuring to producers satisfactory incomes. Important changes are being discussed but as yet are largely in the wishful-thinking stage.

THE POSITION OF EACH GROUP OF FOODS

With this background of pre-war and wartime developments, a summary of the salient points regarding the position of each food group is in order.

WHEAT

Wheat appears almost certain to be in a surplus situation as soon as the relief feeding period is over. The unusually good 1944 harvest assures ample wheat supplies for relief feeding. It is probable that considerable quantities can be fed to livestock and yet meet all human requirements that can be financed with the administrative machinery now in existence. Some idea of the magnitude of the probable wheat surplus can be gained by pointing out that, with favorable prices, wheat-productive capacity is roughly three hundred to four hundred million bushels in excess of pre-war market demands. If western Europe were to remove all trade barriers, it is doubtful if the demand would be increased by more than two hundred to three hundred million bushels. This situation is likely to be chronic, for only a minor part of the land resources used in wheat-growing in the Western Hemisphere and Australia are adapted for other uses, even though wheat goes to animal feed-grain prices.

FATS AND OILS

When the fats and oils from the Pacific come back into world trade, they will add some three billion pounds to the world supply. The production of fats and oils in North America has already turned downward. Further declines are probable in 1945 and subsequent years, even before the Pacific areas come back into full production.

Since the oilseed crops usually are grown in systems of mixed farming, downward adjustments in them can be made with less sacrifice than in many commodities. Downward adjustment in soybean production in the United States is likely to be moderate, however, even though supplies of fats and oils increase and prices fall sharply. Because of the high value of the protein meal for livestock feed on the more level lands of the cornbelt, soybeans will continue to have a higher value than oats as a cash crop, even though oil prices go to extremely low levels. The continued production of a fairly large acreage of soybeans in the United States, the re-establishment of the whaling industry, high levels of world cotton production, and the continuation of lard production at a high level suggest that, when the Pacific supplies of fats and oils become available again, existing markets will have difficulty in absorbing the supply at satisfactory prices. An encouraging factor in the fats and oils situation is the apparent upward secular trend in consumer and industrial demand.

COTTON

The cotton surplus is an old story. Unless limited by an international agreement, cotton acreage promises to expand in Brazil, the

Middle East, the U.S.S.R., and perhaps in India. The United States seems likely to continue to produce almost as much on a restricted acreage as it did in the late twenties. Stocks are now at an all-time high. It seems clear that some means of creating a greater demand and ability to buy cotton goods by the Orient is the only alternative to production restrictions or a continuation of the chronic cotton-surplus situation.

WOOL

The loss of the European market has caused Southern Hemisphere wool supplies to accumulate as they did in World War I. Something like a two-year crop will be on hand when the war is over. Offsetting this will be the great need for woolen materials in Europe. The enigma is the amount of purchasing power which can be made available in European countries for wool purchases. Wool prices are now supported by government action both in this country and in the Southern Hemisphere, and a continuation of government support will be required, at least until this war accumulation of supplies is absorbed.

SUGAR

Sugar supplies, after backing up in the surplus-producing areas of the world in the early years of the war because of lack of shipping, are now at rock bottom. A large factor in the utilization of the accumulated sugar supplies has been its use in making industrial alcohol. If a substantial synthetic-rubber industry is maintained during peacetime, it seems probable that market demands and supply may find a balance at profitable prices to producers. If present protective tariffs should be revised downward, world trade in sugar would be one of the chief beneficiaries, but unless this takes place the key to the sugar-surplus problem is very largely one of the demand for industrial alcohol.

PULSES

The vegetable proteins have experienced a substantial expansion in the Western Hemisphere. The income elasticity of these foods is very low, and with a return of peacetime activities and increased supplies of animal proteins for civilian consumption a downward adjustment in the demand for pulses is expected, regardless of international trade developments. As in the case of oil crops, most of the pulses are grown in systems of mixed farming. For this reason downward adjustments in production should be relatively easy to make.

In the United States, however, the maintenance of 90 per cent of parity or comparable prices for dried bean- and pea-growers (as required by law) may result in the accumulation of considerable supplies by the government.

RICE

Japanese capture of Burma and other surplus rice-producing areas in the Pacific completely reversed the pre-war rice picture. Supplies available to the United Nations have been scarce indeed. As a result, production has been increased markedly in India, Brazil, Chile, Egypt, and to a smaller extent in this country. In contrast, the United States was engaging in price-support activities for rice-growers before the war. Rice is likely to be in a postwar position similar to wheat, although it is surely one of those commodities of which the entire supply in prospect is urgently needed.

FRUITS

Fruits appear to be the one category of foods in which smaller supplies are in prospect after the war. Increased production of potatoes, pulses, and manioc account for the wartime increase in fruit and vegetables in the thirty countries mentioned earlier. Fruit production as such appears to have declined because of a lack of shipping space from exporting countries and adverse weather in Europe. The expansion in fruit production after the last war was very rapid, however; and if conditions are favorable, fruit production will recover within a few years. In spite of a short world situation, fruit surpluses may develop in this country as a result of a lack of export demand at prices covering United States producers' costs.

COFFEE

Coffee, largely as a result of a series of short crops and a freeze in Brazil, appears to be in a reasonably satisfactory market position. Some coffee trees have been destroyed in Brazil. The level of employment and world trade will largely determine whether or not a surplus situation in coffee returns.

ANIMAL PROTEINS

When one considers the animal proteins—meat and dairy products especially—the level of employment becomes the dominant factor. Surely, world supplies of animal proteins can and will be maintained at 10–20 per cent higher levels than in pre-war times. Much of this increase will come from increased production and utilization of feed grains and legume hays resulting from mechanization and technical progress in crop breeding and the increased use of fertilizers. A small part of the increase may come from the feeding of wheat, and a small part also will come from the utilization for human consumption of milk solids not fat, formerly fed to livestock.

It seems clear that Canada will attempt to maintain much of her present livestock industry and Europe will rebuild hers. We were on the verge of an animal-protein surplus situation in the United States with our corn granaries full at the outbreak of the war. There will be more animal proteins coming to market after the war. Government economists estimate that even with full employment United States consumer demand will not be sufficient to take these increased United States supplies at parity or 90 per cent of parity price levels. But even though parity prices are not realized, animal proteins have a high income elasticity, and with full employment throughout the world there should be little difficulty in moving the total volume of production into consumption at fairly satisfactory prices.

VEGETABLES

The last food group to be considered is vegetables. Only a very small quantity of vegetables move in world trade. It is unlikely that any large volume of trade in dehydrated or canned vegetables will develop after the war. Here in the United States and elsewhere, no doubt, market and processed vegetable production has increased sharply to meet war needs. Military requirements have been taking a large part of the processed vegetables, leaving civilians a smaller quantity than in pre-war years. It seems highly probable that, when military requirements are eliminated, market surpluses will develop in many of these crops in the United States and perhaps the same thing will happen in other countries.

SUMMARY

The situation may be summarized in this way. More food will be produced after this war than ever before in history. Increased mechanization, increased use of fertilizers, and other advances in technology should give us a 10–20 per cent increase in food production in the Western world within the first decade after the war. Most of this increase will be in fats, animal proteins, and vegetables. It seems probable that this increase will be realized regardless of producer-control measures undertaken, any of which will tend to maintain incomes at favorable levels. If pre-war American experience is a guide, producers following mixed systems of farming under such conditions will find an alternative use for unemployed resources and will speed up technological progress. The unfavorable distribution of purchasing power, the international trade barriers which do not appear to be decreasing, the increased size and numbers of organized producer groups, and the necessary concern for the peasants on the part of newly restored governments all tend to make it probable that market surpluses in a number of commodities will appear at an early date.

There is little reason to be apprehensive, however, provided reasonably full employment can be maintained in the world and a start is made in the lowering of trade barriers. Surplus situations which do develop can be kept under control by following a reasonable price policy, integrated with national and international distribution schemes which are now in the discussion stage.

AGRICULTURAL ADJUSTMENT AND NUTRITION

By HOWARD R. TOLLEY[1]

MY PURPOSE is to review briefly what is known about world food consumption from the standpoint of nutritional requirements and to indicate some of the problems to be solved in adjusting food production and consumption to nutritional needs.

As a step in the process of arriving at conclusions respecting these problems, we need a picture of the present dietaries of the world. Indeed, we need a much better picture than is now available. Merely a statement of national needs and national consumption is inadequate. There are wide differentials in dietary patterns within a nation. Such variations are often correlated with racial, religious, or geographic groups. They usually reflect the wide variations in economic conditions which now exist in most nations. Obviously, all this information is not available, but something is known about the situation, and perhaps its sketchy nature will suggest the tremendous problem involved if the picture is to be painted with fulness and accuracy.

THE ADEQUACY OF WORLD DIETS

One very rough measure of dietary deficiencies is the proportion of energy obtained from cereals and potatoes. Another is the proportion of total calories from crops versus the proportion from livestock products. When a nation derives 80 or 90 per cent of its calorie requirements from cereals and potatoes, there is a strong presumption that mineral and vitamin deficiencies are widespread. On the other hand, when 35–50 per cent of all calories come from animal products, such deficiencies are not likely to be widespread among all groups and classes. These two rough measures of national dietaries are, of course, rather closely correlated (see Table 1). With data of this type, plus the results of a few supplementary studies, it is possible to come to some general conclusions about the adequacy of world diets.

The group of nations that can be said to have a relatively good diet represents only a small share of the world's population. This group includes the United Kingdom, the United States, Canada, Australia, New Zealand, and a few northern European countries like Holland, Sweden, and Denmark. Rather closely approximating the pre-war dietary levels of these nations, but definitely lower, are most of the other countries of western Europe.

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TABLE 1

PRE-WAR ESTIMATED PROPORTION OF CALORIC INTAKE PER CAPITA FROM VARIOUS SOURCES

COUNTRY	PER CENT OF CALORIES FROM CEREAL AND POTATOES*	PER CENT OF CALORIES AVAILABLE FOR CONSUMPTION FROM†	
		Crops	Livestock Products
Canada	30–40	60–65	35–40
United States	30–40	60–65	35–40
Brazil	60–70	70–75	25–30
Uruguay	50–60	60–65	35–40
Argentina	50–60	65–70	30–35
Chile	60–70	80–85	15–20
United Kingdom	30–40	55–60	40–45
Eire	50–60	65–70	30–35
Sweden	30–40	60–65	35–40
Norway	40–50	60–65	35–40
Denmark	40–50	60–65	35–40
Germany	40–50	75–80	20–25
France	50–60	70–75	25–30
Spain	60–70	85–90	10–15
Italy	60–70	85–90	10–15
Tunis	70–80	....	....
Algeria	70–80	....	....
French Morocco	70–80	....	....
Bulgaria	70–80	85–90	10–15
Greece	60–70	85–90	10–15
Turkey	....	85–90	10–15
Palestine	....	80–85	15–20
Egypt	70–80	90–95	5–10
India	80–90	90–95	5–10
China	80–90	95–100	1–5
Japan	70–80	85–90	10–15
Australia	30–40	55–60	40–45
New Zealand	30–40	50–55	45–50
Union of South Africa	60–70	75–80	20–25

* M. K. Bennett, "International Contrasts in Food Consumption," *Geographic Review*, July, 1941, pp. 365–76.

† Based upon unpublished data prepared by the Office of Foreign Agricultural Relations, U.S. Department of Agriculture.

As we go south and east (including Poland and Russia), diets drop in quality, and we approach the point which might be described as chronic and acute dietary deficiency in Egypt and the Middle East. Here we find high cereal consumption and little use of meat and dairy products; fruits are in some cases abundant but usually available only in certain seasons. The deficiency in foods providing niacin is reflected in widespread suffering from pellagra. Inadequate amounts of vitamin A and animal proteins are probably indicated in the prevalent diseases of the eye (conjunctivitis, keratitis, and trachoma). Mineral deficiencies are likewise present.[2]

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[2] Afif I. Tannous, "Food Production and Consumption in the Middle East," *Foreign Agriculture*, November, 1943.

Moving into the Far East, we come clearly into groups of countries in which food is grossly insufficient in both quantity and kind. The peoples of India are only somewhat more poorly fed in years of famine than in years of relative abundance. China suffers acutely from various specific deficiencies and from the cataclysms of periodic famine. Japan is exceptional in Asia, but its pre-war consumption had probably not approached most western European countries in terms of nutritional adequacy.

The greater portions of Africa and Latin America stand only moderately above the acute distress levels characteristic of large areas of Asia, comparable, perhaps, to the Balkans and the Middle East. The peoples of tropical Africa are known to suffer from widespread insufficiency of mineral elements, especially calcium and phosphorus, as well as of vitamins A and B. The widespread prevalence of rickets may be related to low consumption of animal products. In tropical South America, mineral—especially calcium—deficiencies are prevalent, and consumption of animal proteins and the protective foods is far too low for minimum standards of health.

Even in the nations in which nutrition is nominally on a high or fairly high level—western Europe, New Zealand, Australia, the United States, and Canada—and in which nutritional deficiencies are less general and involve fewer nutrients, regional and class variations are striking. There tends to be a general deficiency in calcium, vitamin A, riboflavin, and, not infrequently, high-quality protein. In the United States we might well call for further substantial increases in the consumption of dairy products and leafy, green, and yellow vegetables.[3] In the United Kingdom the general picture is probably not dissimilar.[4] Deficiencies are most striking in the consumption of vegetables, dairy products, and fruits with the concomitant lack of the protective substances to be supplied from these sources.

THE WORLD DIETARY SITUATION

Thus it appears that (1) there are large groups and classes of low-income people in the best-fed countries of the world who are in need of increased amounts of protective foods, especially dairy products, vegetables, and fruits; (2) in what might be called the middle group of countries on the world dietary scale, increased amounts of these protective foods for almost all the population should be supplemented by additional animal proteins for many people if an adequate level of nutrition is to be reached; and (3) in very great areas as, for instance, India and China and a large proportion of the tropics, there are deficiencies among most of the people in almost all phases of their diets, except, perhaps, some of the cruder energy foods.

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[3] National Research Council, *Inadequate Diets and Nutritional Deficiencies in the United States* (Bull. 109).

[4] John B. Orr, *Food, Health, and Income* (London, 1937).

If this summary sketch of the world dietary situation is generally accurate and if the major deficiencies are to be met from nonsynthetic sources, the general outlines of what may be necessary in the way of adjusting food production to nutritional needs begin to emerge. First, it appears clearly evident from practically every source of available information that there is a need for channeling more of the protective foods into the diets of low-income groups in most industrialized societies. Second, there are strong indications that the total world production of milk, vegetables, fruits, eggs, fish, and meats must be substantially increased if nutritional requirements are to be met and that there must be a much wider distribution of these foods among large population groups in practically all countries. There may also be need for some increased production of cereals and pulses, although this conclusion is less certain than the others and is partially dependent upon the palatability or lack of monotony which is desired in the world dietaries. While conclusions of this nature are obviously based upon extremely inadequate information and involve certain very tenuous assumptions, they can, nevertheless, be used as rough guides until there is further exploration of the field.

The general problem is one of closing the gaps between scientifically formulated needs or requirements, on the one hand, and production and consumption, on the other. Nutrient requirements, such as calories, proteins, minerals, and vitamins, provide only a bare skeleton for planning ways and means for modifying food production to the end that it will conform more nearly to scientifically determined consumption requirements. For example, the diets of Americans could be improved with a much lower level of food production than we have now. This situation could result from a shift in consumption from high-resource-using foods to low-resource-using foods—from meat and butter to beans and vegetable oils. Conversely, the level of food production would need to be increased substantially if our low-income people suddenly became the recipients of additional income which would permit them to consume meat, milk products, and fruits in the quantities common to high-income consumers. Therefore, the production pattern which may be needed depends in part upon the level of tastiness desired, as well as upon nutritional requirements.

How can the problem of adjusting production and consumption be solved? One approach would be to increase the demand for foods that are needed by the people who need them. This approach would involve (1) education and training to modify existing individual food preferences, (2) altering price relationships so that the more-needed foods become cheap relative to the less-needed foods, and (3) redistribution of incomes so that low-income groups can more adequately compete in the market for the foods for which they have especially heavy need.

HOW TO ATTAIN BETTER DIETS

An educational program designed to develop a new system of personal preferences with respect to food consumption would necessarily be a long-time process; old habits would have to be broken down and new ones adopted. But, given sufficient time and a sufficiently intensive program, the nutritional standard could probably be made the standard of choice for most individuals.

Theoretically, it would be possible to achieve the nutritional goal through the management of prices. Instead of modifying personal preferences through education and training, prices of foods consumed by individuals could be adjusted so that, with the given scales of preference, individuals would maximize their respective total satisfactions with combinations of foods compatible with the nutritional goal. Prices of foods requiring a greater consumption according to the nutritional standard would be lowered, and the prices of foods requiring a lesser consumption would be raised. Thus an incentive would be provided for individuals to take more of the lower-priced food even though they would rather have the food priced relatively higher. But in present-day societies, unless price-adjustment schemes were coupled with measures designed to equalize income, price management probably would fall far short of achieving the nutritional goal.

If substantial progress were to be sought solely through price management in a commercialized society in which a full utilization of resources is also a goal, it is highly probable that consumer prices and producer prices would have to be disassociated. One set of consumer prices, relatively low for foods requiring a large consumption and relatively high for foods requiring a low consumption, would be needed to achieve the nutritional goal at the consumer level. But another set of producer prices tilted in the opposite direction from the consumer prices would probably be required in order to bring forth the increased production of the most-needed foods and the decreased production of the less-needed ones.

The tremendous influence of full employment and active foreign trade in raising incomes and thus bringing demand into line with nutritional need is illustrated by analyses which we have recently been making in the Bureau of Agricultural Economics. In these analyses we took 1950 as our base year. In that year there must be at least 55½ million jobs available in order to have full employment. About 8 million of these jobs would be in agriculture, and the remainder would be in nonagricultural occupations. Assuming that average wholesale prices would be maintained at the same level as in 1943, the national income would be about 150 billion dollars.

However, average farm prices would not be so high in relation to nonfarm prices as now. On the basis of past relationships and without government programs to support farm prices, the farm-price level would be a little below parity, compared with a level about 15 per cent above parity this year. Cash income from farm marketings to the 8 million workers and their families would be between $16 and $17 billion, as compared with $20 billion to 8.8 million workers last year.

In arriving at these estimates, it was necessary to make estimates of imports, exports, and domestic consumption. If the national income were maintained at $150 billion and foreign trade followed the trends of the interwar period, it might be expected that total annual imports of agricultural products after this war would be about $2 billion. This compares with average annual agricultural imports in 1925–29 of $2.2 billion, and in 1935–39 of $1.2 billion. Such imports would include, in large measure, commodities this country does not produce, such as rubber, coffee, and bananas. On the same basis, agricultural exports would total about $1 billion. This estimate compares with an average of $1.9 billion for the years 1925–29; it is one-third larger than the average for 1935–39 and is double the amount for 1940.

Under these conditions, per capita consumption of most agricultural products not only would be substantially higher than it was in the interwar years but also, for many commodities, higher than it is now. Moreover, the greatest increases in the demand for food would, in general, be among those types of products which are most needed in American dietaries from a purely nutritional point of view (Table 2). For instance, the per capita consumption of dairy products might be expected, under the conditions of full employment described above, to be the equivalent of 880–900 pounds of fluid milk, compared with about 800 pounds annually during the 1935–39 period. Yet the average farm price of milk might be expected to be almost double what it was in the 1935–39 period. The per capita consumption of citrus fruit might be expected to be almost 50 per cent higher under conditions of full employment than it was in 1935–39, and that of vegetables, both fresh and canned, would be substantially increased. These shifts are definitely in the direction of better nutrition, and the whole pattern of prospective consumption under conditions of full employment indicates a series of specific advances toward better diets with farm prices at a level which, at the present time at least, is generally considered fair and adequate.

The maintenance of full employment and the volume of foreign trade mentioned above will not, of course, solve all the problems of agriculture and nutrition. If average crop yields by 1950 should increase by 10–12 per cent above pre-war averages, if milk production per cow and egg production per hen were to increase about 5 per cent, and if the general efficiency with which feed is utilized by livestock should increase by 2½ per cent, the total production requirements could be met by the cultivation of about 330 million acres of cropland, compared with 352 million acres actually harvested in 1943. Thus the size of the agricultural plant would have to be reduced or additional outlets would have to be found.

Even with full employment, a significant number of people would still have low incomes and inadequate diets. How large this group would be is very difficult to estimate, because we know far too little about the distribution of incomes at full employment levels and about expenditure patterns for food by the various income groups. No doubt, low-income families would need more dairy products and more leafy, green, and yellow vegetables than they would be able to procure without special assistance. Hence there would still be a need for a publicly financed nutrition program for low-income people, both from the nutritional point of view and from the viewpoint of producers wanting the widest possible markets for their products. Such a shift in consumption would absorb the product of some additional cropland. This shift, plus a more soil-conserving type of farming, might result in a balance of production and consumption without any great strain on the agricultural industry.

TABLE 2*

COMPARATIVE PRICES AND PER CAPITA CONSUMPTION OF MAJOR FOOD COMMODITIES IN THE UNITED STATES

COMMODITY	FARM PRICES				POUNDS CONSUMED PER CAPITA†	
	Unit	Parity, July 15, 1944	Average 1935–39	Assumed 1950	Average 1935–39	Estimated 1950
Dairy products‡	100 lbs.	$ 2 23	$ 1.49	$ 2.90	801	894
Citrus fruit	Index	....	100	120	49	75
Other fresh fruit§	Index	....	100	180	89	92
Commercial truck	Index	....	100	170	96	109
Canned vegetables‖	Index	....	100	150	31	45
Meats and poultry¶	Index	....	....	....	....	....
Beef	100 lbs.	$ 9.21	6.56	$ 10.25	63	69
Veal	100 lbs.	11.50	7.80	12 00		
Lamb	100 lbs.	10.00	7.79	11.45	7	7
Mutton	100 lbs.	7.70	3.93	6.90		
Pork	100 lbs.	12.40	8.38	11.25	56	84
Chickens	Lb.	0.19	0.15	0.20	18	27
Turkeys	Lb.	0.24	0.16	0.26	3	5
Eggs**	Doz.	0.34	0.22	0.29	37	44
Corn	Bu.	1.09	0.69	0.90	56	60
Wheat	Bu.	1.50	0.84	1.10	221	215
Peanuts (in shell)	Short ton	163.20	71.00	100.00	6	9
Sugar beets	Short ton	9.35	5.00	6.80	96	115
Sugar cane	Short ton	6.34	2.85	4.40		
Potatoes	Bu.	1.23	0.72	1.00	130	117
Sweet potatoes	Bu.	1.49	0.81	1.10	23	20
Dry edible beans	100 lbs.	5.73	3.52	4.70	9	9

* The price and consumption projections for 1950 were made by the individual commodity specialists in the Bureau of Agricultural Economic on the assumptions of: (1) full employment in 1950; (2) a general price level the same as in 1943; and (3) a farm price level in peacetime relationship to general prices.

† The consumption of pork excludes lard, that of corn excludes malt liquor, and that of sugar beets and sugar cane is in terms of refined sugar.

‡ Fluid-milk equivalent.

§ Excluding noncommercial apples.

‖ Processed weight.

¶ Prices are on a live-weight basis, and consumption is on a dressed-weight basis.

** Parity price has been adjusted for seasonal variation.

It must not be forgotten, however, that calculations based upon an assumption of full employment and a level of foreign trade in agricultural products roughly halfway between that of the 1920's and the 1930's present a fairly optimistic picture. Suppose there were 7 million unemployed in 1950; about the same number as in 1941.

With this amount of unemployment, it is reasonable to assume that the general price level would be below the 1943 level, possibly about the same as the average for the years 1938–42. The national income would stand at approximately $105 billion, or $45 billion less than under full employment. Farm prices would average about 90 per cent of parity; cash income from farm marketings would fall to about $12 billion, or almost a third. Net cash farm income would fall to about one-half of what it would be with full employment. Under these conditions the domestic consumption of farm products would decline somewhat; and, though exports might rise a little because of the lower level of prices, it is fairly certain that we would face the problem of what to do with the products of 25–45 million acres of cropland.

Notwithstanding the hazards of statistical projections of this general nature, the analysis points definitely toward the following conclusions: (1) that the agricultural industry of this country, with parity prices, full employment, and active foreign trade, could produce an adequate and tasty diet for all our people and still run the risk of piling up surpluses; and (2) that, if unemployment develops, while farm prices remain close to parity, American diets would be restricted, and agricultural surpluses would begin to reappear.

In this country we are faced with the very practical fact that farmers, and particularly farm-organization leaders, are wedded to a farm-price level at about parity. Moreover, farmers want to produce at capacity. Caught between these two sets of desires, the chances are good that Americans will be rather well fed in the post-war years, unless national income and employment decline very seriously and the people refuse to support government-financed food programs. At the best, some farm prices will probably be under the pressure of heavy production.

In view of this general situation, economists are likely to call for a lower agricultural price level and a shifting of farm labor into industry, where the demand for the products is more elastic. This type of policy is, however, an unpopular one among farmers, and it is politically hazardous, especially when industry and trade are not operating at, or very near, capacity levels. Hence, we can expect pressures for more "conservation programs," for government-financed food programs for the underprivileged, and possibly for some type of export subsidy.

This last point offers a field for more study than has yet been given it. The possibility of American farmers contributing to the diets of undernourished peoples of other nations has usually been considered from the very materialistic point of view of whether or not we can safely engage in unilateral export dumping. The future responsibilities of this nation to contribute to the economic and political stability of the world should preclude unilateral action of this nature. Yet the opportunity for collaborating with other nations has not been fully explored. In the past we have been guilty of limiting our international agricultural policy-making to a series of efforts to agree with other exporting nations to reduce exports in order to maintain prices. Yet there are reasons to believe that just as a food-stamp plan in this country is acceptable to both producers and consumers, so an analogous multiprice system on an international scale might be acceptable to both producing and consuming countries.

In many areas of the world much can be done to encourage farmers and agricultural laborers to produce and consume at home more of the nutritionally needed foods. This type of procedure offers real possibilities for improving the nutrition of many poverty-stricken laborers, sharecroppers, and small tenants—especially in the intensive cash-crop regions of the world. In many cotton, sugar, tobacco, coffee, and rice areas the addition to the family income of the production from a garden, a cow or goat, a sow and a few chickens, primarily for home-consumption purposes, would be a type of production adjustment not directly dependent on market-price relationships or ordinary commercial-cost considerations. The effectiveness of this type of program necessitates a close co-ordination of educational activities, the extension of credit, and the improvement of land-tenure arrangements, in a manner similar to the work being carried on by the Farm Security Administration.

Another approach to the problem of adjusting production and consumption to nutritional need would include research and extension programs for lowering the cost of producing foods most needed from a dietary standpoint. New processing, packaging, and transportation methods could also be very important in this cost-reduction approach. For instance, the dehydration of milk, fruits, and vegetables could conceivably be the means by which these products are placed on the local markets of many tropical areas alongside the more common beans, flour, lard, and dry fish.

Certainly there is need for a wider exchange between nations of more dependable information concerning the relation between nutritional requirements, on the one hand, and actual production and consumption, on the other. This was recognized by the Hot Springs Conference on Food and Agriculture. Such information is basic to any intelligent international collaboration in which improved nutrition is an element in co-operative programs for stabilizing and expanding production of agricultural raw materials important in world trade.

INTERNATIONAL COLLABORATION FOR IMPROVED NUTRITION

Few nations can appropriately plan to meet their domestic nutritional requirements entirely from domestic production. The consequences are obviously unacceptable. It would be nothing more than a return to national self-sufficiency, the insanity of which is quite clear to all. The situation of England, for example, if such a program were accepted literally, would necessitate a conversion from an essentially industrial, commercial society to an agricultural one, and a greatly reduced standard of living. But if the food needs of England are to be taken into account in production planning, who, then, is to take them into account? Obviously, in addition to England, the answer must include Canada, the United States, Australia, Denmark, New Zealand, Cuba, Argentina, and a long list of other countries. But how are these countries to take it into account? This is the much more perplexing question. International planning involves even more economic complications than those confronting the planners of each nation, which, as we have already seen, are none too simple for our own country.

The complete development of a world-wide program for improved nutrition would require, first of all, a review of the production-consumption balance in relation to nutritional needs for practically every country in the world. Attention would have to be given to trading regions, spheres of influence, and monetary and political blocs. A final integrated picture for the entire world would need to be developed as a mosaic of the production-consumption situation, country by country and region by region. This is a long-time job for co-operating nations, which might well be inaugurated by the Food and Agricultural Organization of the United Nations. In no country is the agricultural production goal in the postwar years likely to be purely a nutritional goal. It is most likely to be a mixture of fair prices to producers, adequate nutrition to consumers, and, in this country at least, resource conservation. The degree to which the concept of adequate nutrition will appear in this multiplicity of objectives is problematical. Its influence appears to be growing in general public opinion, but it may still play a relatively minor role.

As in the case of our own domestic economy, educational programs and programs for an expanding economy will be very important in improving the diets of the world. The latter type of programs would put major emphasis upon limiting trade restrictions, such as tariff and import quotas, stabilizing currencies, lending capital to deficient areas, and stabilizing world trade in raw materials. The logical result of these types of action would be to increase the demand for some foods and to concentrate production of the internationally traded commodities into the low-cost-of-production regions of the world. They say nothing about "nutritional adequacy." Nevertheless, they hold some real potentialities for being a course of action which will tend toward better nutrition throughout the world.

There are very good chances, for instance, that the increased consumer demand for food, which would result from freer international trade and an expanding world economy, would be focused largely upon the supplies of food which are generally lacking in the world dietaries—dairy products, fruits, vegetables, and meat. The empirical evidence from the Western world indicates that this is one result of increased family income. Such a result would tend to bring about some increased production of these foods.

Moreover, as in the case of our own domestic economy, complete reliance upon this type of approach for adjusting world production to nutritional needs is likely to leave many nutritional problems unsolved. In any event, progress would be extremely slow in areas of highly specialized production with bountiful supplies of cheap labor. Just how much the diets of the Puerto Rican sugar laborer, the small Indian farmer, the southeastern Asia producer, or the Negro sharecropper of the United States would be improved by this general approach is a highly debatable question. Still another difficulty arises from the probable unwillingness of many producer groups actually to accept the degree of competition involved in an all-out program of expanding international trade. Also, the fear of economic and political instability, on the international front, is an impeding influence.

These and similar considerations suggest the need for international collaboration more specifically aimed at the expansion of food consumption throughout the world. It is not only conceivable but entirely appropriate that devices similar to our own food-stamp plan and school lunch program be developed and financed co-operatively on a world-wide scale. In practice these could be most readily adopted in conjunction with efforts to dispose of so-called "surpluses" of agricultural products important in world trade. This approach has distinct possibilities for supplementing in an important way whatever can be accomplished through international collaboration on the broader economic front.

FOOD AND INCOME

By P. LAMARTINE YATES[1]

THE first cause of hunger and malnutrition is poverty." These are the unambiguous words of the United Nations assembled in conference at Hot Springs in June, 1943. There is no longer anyone who would seriously dispute that statement.

POVERTY AND NUTRITION

Poverty *is* the main cause of malnutrition; the facts are well established. For example, in a nation-wide survey of city families undertaken in the United States in 1936 the consumption of fluid milk was 84 quarts per capita in the lowest-income bracket and 242 quarts in the highest-income bracket, the consumption of tomatoes and citrus fruit was 31 and 240 pounds, respectively. Similar evidence is available from the United Kingdom, where Sir John Orr showed that the upper 10 per cent of the population spent eight times as much on fruit, six times as much on vegetables, and consumed nearly three times as many eggs as the lowest 10 per cent. But the lowest-income brackets in the United States and Britain by no means exemplify the lowest-income brackets in the world. Such few surveys as have been made of consumption among the poorest people in the poorest countries show a very much worse state of affairs. There the calorie intake consists of 70–80 per cent cereals, and the intake of vitamins, minerals, and animal protein is woefully deficient. Poverty is extremely widespread; probably not so much as a quarter of the world's population has attained a level of income at which adequate diets can be bought, and these favored few are almost all located in Europe, North America, and the southern British Dominions. We have, therefore, a long way to go before we have removed what at Hot Springs was called "the first cause of hunger."

WORLD TRENDS

Yet there is really no cause to be pessimistic. We live in a period of history when astonishing strides are being made out of poverty toward prosperity. Every year, every week, every day, discoveries are being made which increase man's command over the resources of nature and enable him to produce more and more goods.

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If we look back at the changes which have occurred during the last three hundred years, we can but marvel. For centuries the population of the world had been static, and economic productivity had been static, too; but now suddenly, within the last three centuries, the population of the Western world has increased seven fold and income per head at least threefold. If these figures are anywhere near right—and they do not claim to be more than rough approximations—then the total output of goods and services must have expanded something like twenty fold. However, no matter whether it is fifteen, twenty, or twenty-five fold, in any event the change must be reckoned one of the most dramatic happenings in human history.

Food production has increased, too. Although there are far more people in the Western world, they have most of them incomparably better food. Moreover, the food is being turned out with far less human energy. Around about 1800, two-thirds of the population of the Western world was engaged in agriculture. Today the proportion is down to about one-third, and yet that one-third is supplying us with a far more varied diet. Looking at it another way, one can say that, whereas then one farm family fed itself plus half another family, today one farm family feeds itself plus two other families.

There were, of course, exceptional circumstances which made this possible. There were numerous scientific discoveries which produced what has been called the "agricultural revolution." There was the opening-up of the new world with its virgin lands. These two factors made it possible for the food production to be increased even more rapidly than the rapidly increasing population. You may say that the future outlook cannot be so bright. Admittedly, although in a few countries there remain quite large tracts of land awaiting development, there are no longer any new continents to be discovered. Admittedly, scientific progress was rapid in agriculture in the eighteenth and nineteenth centuries; but, taking the long view, it would be difficult to say that it is less rapid today. Moreover, the rate of increase of population in the Western world is slowing down most markedly. On balance, it ought to be quite easy for food production to continue to keep ahead of numbers and for the proportion of population engaged in farming to continue to fall.[2]

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[2] Conditions in the Far East look very different from this and will be considered more fully below.

This digression on the historical trends may have helped us to see our own times in their true perspective. We live in an era when mankind has developed and is still developing an enormous capacity to increase his income and his food production. During the interwar period, it is true, we failed to operate at anything like full capacity; yet, even so, wealth increased. Given even slightly more rational policies, both national and international, after this war, wealth should increase much faster.

AFTER THE WAR

While most people would subscribe to much of what has been said so far, there are many who are very disturbed by postwar prospects. In their view the belligerent nations and many of those having suffered occupation will be so immeasurably poorer that they will not for a long time be able to afford anything approaching their pre-war standard of living; and as for any proposals to spend public money on nutritional programs, this, it is argued, will be quite out of the question, so great are likely to be the budgetary difficulties of governments. Now, of course, it is true that war causes a great deal of destruction, destruction which in countries that have been fought over or blitzed is obvious to the naked eye. Besides this there are other material losses; plant has had to be neglected and maintenance reduced to a minimum; factories which now produce weapons of war will have to be reconverted for producing weapons of peace. Nor is this all. There are some countries, notably the United Kingdom, which in order to resist the enemy have had to sell the greater part of their income-yielding overseas assets; that itself is equivalent to the destruction of factories and houses—indeed, it may be much more difficult to replace. Yet, when all is said, these tasks of rebuilding and replacement will take a very short time and will employ comparatively few of our people. Except for these few cases we are paying for the war as we go along. It is *now* that we have millions of men in the Armed Forces instead of on farms and in factories, and it is now that the men and women in factories are producing bombers, submarines, shells, and torpedoes. After the war all these people, except in so far as there is unemployment, can go back to producing peacetime goods, and the flow of output will change over from weapons of destruction to things which people can consume. Moreover, we shall quite certainly have a substantial increment in industrial efficiency resulting from all the new techniques which have been learned during the war. In short, there is no reason why the Western countries, unless they hopelessly mismanage their affairs, should not very rapidly reach much higher standards of living than before the war.

The case of the undeveloped countries is rather different; here we have to distinguish between those which have plenty of land relative to their population and those which do not; also between those where the population is increasing rapidly and those where it is not. Broadly speaking, high rates of increase are associated with countries in which the density per square mile is already high.

All these countries are in need of rapid industrial and agricultural development. In those which are only moderately populated the prospects are hopeful. Given energetic action, there is no reason why many of the countries of South America and the Middle East should not forge ahead rapidly. The U.S.S.R. has shown what sort of an industry can be built up from nearly nothing in twenty-five years with little outside help.

In the densely populated countries, especially India, China, and southeast Asia, the problem is more difficult, especially in agriculture. For example, the population of India has increased by 25 per cent in the last twenty years and might easily do the same in the next twenty years. The Indian countryside is so appallingly overpeopled that to increase food production by 25 per cent every twenty years is extremely difficult. Industrial development, however, could go ahead rapidly. India has far more heavy industry today than the Soviet Union had twenty-five years ago. She has built up a great deal during the present war, and, instead of being a debtor, she now has quite considerable foreign assets.

On the whole, we must conclude that both these groups of less developed countries can be more prosperous after the war than before. In some, income per head can rise quickly; in others it will be a hard struggle for output to expand more rapidly than population, yet there is a good chance of even that race being won.

THE TASK TO BE ACCOMPLISHED

IN ADVANCED COUNTRIES

It is, therefore, against a quite plausible prospect of steadily rising incomes in all except the most difficult countries that we have to consider what are the prospects for food consumption.

Let us consider, first, what positive measures can be taken to increase the consumption of food among those groups which have an inadequate diet. Essentially the methods that can be employed are the same for all Western countries: school milk and school meals, special provision for pregnant and nursing mothers and for young children, in-plant feeding for heavy workers, stamp plans for the disposal of temporary surpluses, enrichment of foods with vitamins and mineral elements, and improvements in processing and cooking so as to retain a greater proportion of the valuable substances in the food as actually consumed. There are, of course, many Western countries less advantageously placed for this work. Many of them have a higher proportion of their population in need of a better diet. Many of them have populations with a taxable capacity so low that their national finances would not permit very grandiose schemes. Nevertheless, all of them ought to be able to make some beginning in this direction.

Furthermore, they can supplement this direct approach by the indirect method of income redistribution. The development of social services, education, health, family allowances, and all the branches of social insurance—these are gradually assuring to the people in each nation a national minimum income below which they cannot fall whatever temporary adversity may afflict them. This may prove a very powerful weapon in preventing the worst manifestations of poverty and malnutrition.

Therefore, there seems no reason why demand for food cannot in these countries be maintained at a high and rising level as part of the general social-welfare programs of governments. There remains the problem of nutrition of farm families; here it is largely a question of more effective extension services. There is no reason, for example, why every farm family should not produce and consume a nutritional optimum quantity of vegetables which take up hardly any land and can be cared for in the family's spare time. Similarly, all families could increase their production and consumption of eggs and poultry. Most of them could consume more milk. It is true that some will not be able to afford this last until the productivity of their farms has been raised, but that, too, is part of the general program.

Assuming that the demand for foodstuffs, particularly for the protective foods, has a chance of being really brisk in the postwar world, is there any difficulty about meeting these demands? Can the food be produced? The answer is undoubtedly "Yes." Everywhere in the Western world there are large agricultural-production resources, which, as wartime experience has shown, were not previously anywhere nearly fully utilized. Furthermore, there is a large body of scientific knowledge waiting to be put across to farmers which can increase production quite startlingly. Thanks to the scientists, farmers in the West Indies, for instance, have doubled the output of sugar cane per acre in the last twenty years or in the United States Middle West have notably raised corn yields with the introduction of hybrid corn. There is no reason to suppose that changes of this kind have come to an end. On the contrary, it is more than likely that agricultural production will tend always to be slightly in excess of current effective demand.

Nevertheless, if food is to be eaten in increasingly large quantities, it must be produced reasonably cheaply, which means producing it in the areas most suitable. This implies the rebuilding of a large international trade in foodstuffs; but the trade must be a stable one and the markets and prices secure. If the irresponsible fluctuations of the interwar period are repeated, trade will quickly dry up again. Measures must be devised for making these adjustments and for providing stability without rigidity. It is one of the problems which arise in any program of expansion. We can fairly easily increase demand, and we can quite easily increase production, but the two have to be related to one another.

One cannot leave consideration of these advanced countries without alluding to two serious dangers. The first is that of unemployment. There is no need to elaborate how fatal that would be for any of our proposals, how it reduces purchasing power and prevents governments from continuing their policies of social betterment. Unless we can conquer unemployment, we cannot go far along the road of food and health. The second danger is of persistent disequilibrium in a country's balance of payments. This was certainly one of the most powerful factors operating in the interwar period. Countries with adverse balances were forced into policies of autarchy, and as a result of these policies the channels of international trade became blocked. Unless the Fund Organization foreshadowed at Bretton Woods can prevent this from happening again, many nations will be driven back into insane economic policies and the prospects for better diets and nutrition will become remote. We cannot remember too often that food policy is but one facet of economic policy, just as, in turn, economic policy is but one facet of world policy both economic and political.

IN LESS DEVELOPED, MODERATELY POPULATED COUNTRIES

In this group come most of the countries of South America, Africa, and the Middle East. We have already seen that in many parts of these territories there are great possibilities of increases in income because there are large resources awaiting development. The war has brought to some of these countries important new industries, and the peace will bring many more. Possibly the biggest prerequisite to development will be better systems of communication and transport. More roads and railways will open up new areas to settlement or, in areas already settled, will facilitate more intensive production.

The agricultural possibilities are indeed exciting. There is every reason to expect a notable rise in production and with it an upward movement in farm families' living standards. There is no need to elaborate here on the steps which will have to be taken. They include land settlement, soil conservation, afforestation, irrigation, and land-drainage schemes. They include the establishing of experiment stations, the introduction of better plant varieties and better types of livestock, the training of technical personnel, and in regions of monoculture the diversification of farming. These are all matters in which the new International Food and Agriculture Organization will be interested and concerning which it will probably plan detailed investigations. Some countries have already made a beginning on these problems. In some areas there is already regional consultation and collaboration, notably in the Caribbean and the Middle East. The more one examines these problems, the more impressive appear the opportunities for quite dramatic improvement.

Production policy, both industrial and agricultural, has been mentioned first in the case of these countries because it is indeed the first step. Until they reach a higher level of productivity over the whole economic field, the people of these countries cannot afford better diets. Nevertheless, even while industrial and agricultural development is in progress, the beginnings of a consumption policy can be made. To some extent the methods already adumbrated for advanced countries can be employed, at any rate for the urban centers which are comparatively few. It may be, however, that these countries with their less considerable financial resources may have to devise other and more economical methods of improving nutrition. They will have to look, so to speak, for some short cuts. They may find it possible, for instance, to fortify their stable cereal foods with vitamins and minerals. They may find it practicable to correct certain dietary deficiencies by introducing certain cheap, highly nutritious processed foods. They may develop the use of local herbs and wild berries. There seem to be special fields of research here which deserve more serious attention than they have yet received.

Finally, it may be asked, are these countries going to be food exporters or food importers? As regards exports, most of them already have one or two important agricultural commodities which constitute a part—often a predominant part—of their export trade. They will certainly wish, even if they somewhat diversify their farming, to retain these exports in so far as they are able and will hope for a more secure, less fluctuating market than in the past. As regards imports there are a few who for environmental reasons will continue to import certain staple foods, corn, for instance, or sugar, which they cannot profitably grow at home. But there is little prospect of their becoming large-scale importing countries like those of northwestern Europe. Even those, for instance, which cannot develop a dairy industry except at prohibitive cost will hardly be able to afford to import processed milk except for babies. They will be needing their scarce foreign exchange to acquire the weapons of industrialization.

IN UNDEVELOPED, OVERPOPULATED COUNTRIES

It is in these countries that the problems are truly formidable. It is in these that the chances for rapid increase in per capita income appear least good. Already the ratio of population to known resources is extraordinarily unfavorable, and with the rapid increase in numbers it grows more unfavorable every day. Concerning industrialization and the development of communications, enough has already been said. Speed is the prime essential. A nutrition and consumption policy in the Western sense of the term can, of course, be applied only to the urban populations, which are still but a small fraction of the whole. For the rest, nutritional policy is agricultural policy in the sense that it means improving the incomes and the food-consumption habits of the farm population. The agricultural problem is, in brief, to intensify production at the maximum possible rate because, even if considerable numbers of people can be given occupation in the developed industries, there will still remain so many on the land that only the most intensive farming can give them adequate incomes. This means a concerted attack with all the offensive weapons of agricultural science: soil conservation, afforestation, irrigation, better seed, better implements, the use of organic and inorganic fertilizers, better-quality livestock, reformed credit facilities, and establishment of extension services. This program will be far more of an uphill task than similar programs in the less densely populated countries. The farms are so small, the strips of land so scattered, the families so large, that the farmer literally has not elbow room and cannot possibly adopt modern methods. There is a great task here for those who are willing to help prepare these programs either in the laboratory, at the experiment station, or down among the villagers. Until agricultural production has begun to be tackled successfully, it is idle to talk about nutrition in these countries; and the start cannot be made on agricultural production unless industrialization is going ahead at rapid speed.

What are the prospects in these countries for international trade in foodstuffs? It may be anticipated that they will continue exporting those commodities in which they already have a considerable market—tea, for example, jute, and peanuts. It is sometimes thought that there should be a great opportunity for imports, and it is true that China and other Asiatic countries had begun to import large quantities of grain, sugar, and other staples. But, taking the long view, it is unlikely that this can go very far for lack of foreign exchange. It will probably be a hard job to increase production faster than population. It will certainly be hard to develop any sort of exports, since, if a large part of current income is to be set aside for capital development, there will be heavy pressure on goods for current consumption. (Exports may, indeed, fall for a time as they did in the case of the U.S.S.R.) It follows that these countries are likely to be short of foreign exchange and that such little as they have will be carefully husbanded and reserved for the purchase of raw materials and equipment essential for the building-up of industries. As far as food is concerned, these countries will be obliged to rely mainly on their own resources.

INTERNATIONAL POLICIES

This brings us back to problems of international adjustment. There may at one and the same time be a great deal of surplus grain in Winnipeg and a great deal of hunger in China. The Canadians cannot sell the grain to the Chinese if the Chinese have nothing to offer in exchange; they cannot give it away, at least not as a regular thing; and, finally, the Chinese cannot borrow it since, while foreign loans may be justified to build up income-yielding assets, they can scarcely be justified for financing current consumption.

In short, we have to face the hard fact that what we call effective demand is a direct product of current income levels. That is, indeed, why so much of this paper has been directed toward discovering what we can anticipate in regard to incomes in various regions of the world. The peoples' demand for food at the income levels current in these poorer countries is very different from their nutritional needs. The tantalizing thing is that it may be easy to expand agricultural production in the Western world, where it is not so urgently wanted, and very hard to expand it in the East, where everything produced can be immediately consumed. There is a very real difficulty here and a very grave danger of international maladjustments.

All I would point out here is that in a sense this danger exists at national levels. Within the nation there are groups who cannot afford to buy the food they need. Yet in our social thinking, as the last paper indicated, we are beginning to get away from the criterion of purchasing power. We are using consumer subsidies and income redistribution to make sure that people get what they need. This is all rather new in the thinking and policy of governments. We can hardly expect in the same minute to start the same kind of technique as between nations. Ultimately, perhaps, we may. We may redistribute purchasing power internationally. We may reach a state of mind in which we do not always feel obliged to apply the money criterion to the international demand for goods.

That is all rather a long way off. Until then we must concentrate on the more modest ways of helping less developed countries, notably by helping them to industrialize and to improve their farming. Even this demands a degree of organization and international collaboration which is only just beginning to be acceptable. It demands activity not only in the financial spheres but in the industrial, commercial, and agricultural spheres, too. It is a job which the new Food and Agriculture Organization has placed right at the head of its program.

OBSTACLES TO BETTER NUTRITION DESPITE THE LARGE SUPPLY OF FOOD IN PROSPECT

By MARGARET G. REID[1]

A STATEMENT of obstacles might be likened to a diagnosis; and a diagnosis of nutrition, to be useful as a guide, must be based on an understanding of what has been responsible for the existing level of nutritional health. Otherwise, policy must be based on sheer speculation and guessing.

Although knowledge is steadily advancing in many areas, it is still limited, and there are important gaps in nutritional knowledge. We know even less about the psychological, economic, and political forces to be encountered in steering toward the goal of better nutrition. Hence ignorance must be listed as a major obstacle, and continued research is needed on many fronts.

To only a very limited extent, for instance, has the status of nutritional health been measured. This fact greatly handicaps the study of factors affecting it. Much needs to be done by way of developing standard tests and using them to determine the occurrence of various degrees of nutritional health in the population. Nutritional health needs to be studied in conjunction with food consumption, food eaten both at home and away from home and the factors affecting it.

Ignorance is a major obstacle, but preoccupation with the many unanswered questions related to the matrix of forces which block nutritional progress must not be allowed to interfere with using existing knowledge. A competent practicing physician makes his diagnosis, using the best knowledge available; and, since diagnosis looks to improvement, knowing what is desirable and how to achieve it is likely to be looked upon as more important than understanding all the whys and wherefores.

Concentrating on how to achieve nutritional health seems to be especially important with respect to the psychological, economic, and political factors. Here, unless research is focused on factors that impede progress, a great deal of effort will be wasted.

A clear-cut objective is essential to success. Success in achieving better nutrition depends on having a nutritional policy as such. It should not be an accidental accompaniment of effort to provide better farm income. In other words, efforts to promote better nutrition should not be turned off or on as the farm groups, on the one hand, turn to government for aid in maintaining farm income or, on the other hand, denounce the government for interference with the American way of life.

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The "marriage of nutrition and agriculture" may suggest an unstable condition. It is, furthermore, very unsuitable if nutrition and agriculture are made one and that one is agriculture. Nutrition programs may be co-ordinate, but they must not be subservient to programs to improve farm income.

ORGANIZATIONS FOR BETTER NUTRITION

Organizations for better nutrition are very important means of developing a nutrition policy. Each country will need some governmental agency whose function it is to assess nutritional needs and to investigate the effect of various types of programs. Strictly scientific investigations in which all details of methodology are made known might well be carried on in a department of agriculture; but it is highly important that other agencies exist with major responsibility for relating the data to suitable policies.

In any government there might well be an interdepartmental nutrition committee so that nutrition policy might be discussed by all government agencies with important interests in nutrition.

Organizations are also important at state and county levels. It seems important to consider what might be salvaged for postwar use of the nation-wide system of state and local nutrition committees. Many changes, including a reorientation of functions, would be needed.

Professional groups, both nutritionists and social scientists, have, to date, given too little attention to nutrition policies. It is from professional groups that independent criticisms of government policies come. Wisdom comes only after facts are secured and carefully appraised. These groups have also a very important role in developing public opinion.

The Food and Agriculture Organization—the successor of the Interim Commission on Food and Agriculture—is presumably to give leadership on nutritional policy on the international front. Special effort will be necessary here, too, if nutrition is not to be the handmaiden of agriculture.

A major assumption has been laid down for this discussion, namely, that large actual or potential supplies exist, not just in the world as a whole but in each of the separate countries. Hence the issues of international trade, Lend-Lease, and other means of getting food imported need not concern us here. Such simplifying assumptions must be made in economic analysis, various factors must be isolated in so far as possible and discussed one by one; otherwise, one is likely to find himself in the position of the man who got on his horse and rode off rapidly in all directions.

A warning signal should, however, be posted on the assumption implied in the assigned topic. Consumption cannot be compartmentalized. Large supplies of food in prospect are possible year after year only if there are large supplies of other consumer goods. Improvement in consumption in general is necessary for adequate nutrition, financed either by family incomes or from the public treasury.

There are further dangers in dismissing too lightly the problem of supply. A total food supply adequate in nutrients for a given population may be unsatisfactory for many families because of poor market facilities. There is too great a tendency, in studying the food situation in the country in general, to look at it in terms of the national average and not to consider how food supply breaks down among different regions as well as among different income groups.

Even in the United States of America, with extensive transportation facilities, refrigeration, and year-round supplies of fresh products coming into many markets, many families living in many rural communities suffer some malnutrition because of seasonal changes in supplies available. It may be that solutions can be found in frozen foods, cold-storage lockers, and better home gardens. In less developed countries much greater attention may need to be given to production for family use and to making market supplies available in more remote areas. Improvement in market supplies may also be needed in some places because of mineral deficiencies in local plant foods.

Bad sanitation may bring a high incidence of certain infections which lower nutritional health, and it may also restrict the consumption of important foods. There are, for example, many small communities in the United States in which low milk consumption is a direct result of poor milk sanitation.

Both total nutrients in the food supply and their distribution among the various foods are important. The United States provides an excellent example of a country where the nutrients in the total supply are relatively adequate but where the very low quality of a major portion of the food supply, combined with existing food habits, has greatly decreased the likelihood of a good diet for those relatively uninformed in the science of nutrition. Up until the time when much of the white flour and bread were enriched, a large portion of the food supply, measured in terms of calories, provided none or little of the protective elements.

Improvement in the quality of the food supply would tend to come from improving incomes and from consumers giving high-quality foods a higher preference rating. In addition, subsidy and regulation both have a place in reducing likelihood of a poor diet through improving the quality of the food. In some places rules bearing on the degree of refinement of various foods are needed—for example, of wheat flour and rice—or enrichment with synthetic vitamins or dried milk may be made mandatory or encouraged through subsidy. Labeling rules which define the conditions under which special claims can be made for foods serve to improve the quality of certain foods.

There are wide differences in the nutrients in foods with breeding, soil type, storage, etc. How important are these variations? What kind of hazards, if any, may such variations introduce for consumers in different areas? And how can supplies of the vitamins, minerals, and amino acids most likely to be deficient in the diet be increased in the total food supply?

It is not sufficient to consider only nutrients of foods in the market. They should be followed through to actual ingestion. Nutrients *consumed*, not nutrients *purchased*, determine nutritional health. What method of food preparation brings the least loss of nutrients? Is loss of nutrients greater in restaurants than in homes? Meals in restaurants are becoming increasingly important, at least in the United States. Even before the war there was a marked trend toward a greater number of meals being eaten in restaurants; the war has probably speeded up this type of change.

INCOME LEVEL AND NUTRITION

Low income is the obstacle to which more frequently than to any other is assigned responsibility for low-level nutrition. Numerous studies in the United States have shown that the higher the income, the smaller the proportion of families consuming a diet having nutrients that fall short of the standards set by the National Research Council.

Nevertheless, at every income level except the very low, some families manage to get a good diet, and even where income is very high some families fail to have a good diet. High income cannot overcome the effect of ignorance or indifference to nutritional health. A study of the variations in other factors affecting nutrition in relation to the adequacy of nutrients at the various income levels should yield interesting results.

To what extent is adequacy associated with different cultural patterns? Facilities for food preparation? Buying habits? Are there significant differences among communities? What is the relation of level of savings to adequacy of nutrients in the diet? What is the relation to expenditures for other types of purchases?

Even though there are a great many factors associated with income which affect nutrition, raising low incomes in most countries is a fundamental way to better nutrition. Full or high-level employment, with something approaching competitive wages, would go far to eliminate a large proportion of the very low incomes. It would also go far toward solving the problem of farm surpluses by maintaining a market for products and by maintaining economic opportunity for surplus farm population in nonfarm occupations.

But it should not be assumed that full employment will raise all incomes to levels at which the purchase of an adequate diet is reasonably well assured. Temporary periods of unemployment will exist, and unemployment allowances, combined with savings available for such emergencies, may be very low. Families from time to time, for other reasons, may not be self-supporting. Many relief budgets are insufficient to provide an adequate diet along with the other things which the families look upon as essential. Hence, even though we hopefully look forward to a period of full employment, it is still important from the standpoint of nutrition to consider the size of the unemployment allowance and the relief standards in relation to food consumption.

Although many people have found it necessary to revise their ideas of the number of unemployables in the population, it seems highly probable that a significant proportion can be employed only at wages unlikely to provide an adequate diet. Low efficiency may preclude the possibility of increasing wages, or family need may be very high because of a large number of dependents.

If the objective of an adequate diet for all is to be pursued, what course of action is to be recommended? A contribution to peak needs in the family cycle can be made through family allowances varying with number of children; free school lunches, penny milk programs, and food subsidies for pregnant and nursing mothers and preschool children might also be used. Real incomes can also be increased by subsidized housing, medical care, and other types of services.

Proposals have also been made to subsidize food not just for children and mothers but for low-income families in general. This may be done through giving low-income families extra spending power which can be used only for food or by using subsidy to lower the prices of foods which are especially important for a low-cost adequate diet.

Although the food-stamp plan in the United States was initiated as a surplus-removal program to benefit agriculture, the favor with which it was received stemmed in large part from the contribution which it made to the diets of low-income families. It was probably also psychologically more satisfying to many farm people than restriction on production or the destruction of food.

The disappearance of farm surpluses early in the war brought an end to the food-stamp plan. Any major decline in farm prices or the piling-up of surpluses, if support prices are provided, is likely to bring pressure from farm groups for its revival. If the surpluses include a range of high-quality foods, the consumption of these surpluses to low-income families should serve to improve the quality of the diet.

Resistance to the program is likely to come from those who dislike the distinction which the program makes between the participants and the nonparticipants. Social workers who for many years have battled to get cash relief in place of grocery orders feel that the food-stamp plan constitutes a backward step. To only a very limited extent has it been extended to families not certified for direct or work relief. Thus it has failed to reach many families whose incomes greatly limited the likelihood of their getting adequate diets.

If, in the absence of widespread unemployment, the food-stamp plan is to be used to dispose of a considerable volume of surplus foods, it will be necessary to develop a system of certification of eligibility. All experience to date indicates that such a system would be very expensive, and much hostility is likely to develop because of the social distinction involved.

PRICE LEVEL AND NUTRITION

High prices of food in general reduce the purchasing power of the consumer's food dollar and restrict food consumption. Relative prices of various foods also have a bearing on adequacy. In general, if income is restricted, a low price encourages, and a high price discourages, high consumption. A major method of minimizing the influence of low income as a barrier to better nutrition is to lower prices. A proposal has been made for lowering prices in order to improve nutrition by Sir John Orr in an article entitled "The Role of Food in Post-war Reconstruction" in the *International Labour Review*, March, 1943. He sketches a program for bringing the main foodstuffs within the purchasing power of everyone. He states:

> "The Commodity Boards would offer the producer a guaranteed market and also a guaranteed price calculated to call forth the total amount needed. They would in turn sell to the trade at a wholesale price calculated to be such that the retailer, giving the minimum of distributive service, for example, selling on a cash-and-carry basis, would be able to offer the foodstuffs at a price within the reach of the poorest. Each commodity board would be provided with funds to bridge the gulf between what it needs to pay the producer and what it gets from the traders."

The war brought experimentation in many countries in cutting the customary links between producer and consumer prices. Such a program lacks many of the disadvantages of the food-stamp plan. It has, however, special problems of its own. Political ideology in some countries is likely to be an obstacle to its extensive use.

Some modifications in prices are possible without subsidy. Nutritionists in Western countries where milk makes a major contribution to dietary adequacy should be more concerned about marketing inefficiencies which tend to raise the price of milk than about a tax to increase the price of sugar. In fact, the American diet might well be improved if the price of sugar were doubled or tripled.

Under certain circumstances, low price may not bring increased consumption. Some low-income families are handicapped by their tendency to identify low price with low nutritive value. This tendency seems more pronounced with reference to qualities of a given food than to various foods. For example, people do not appear to look on sugar as a low-quality food because it is an inexpensive source of calories, but many consumers mistakenly think that skim milk has very little food value, that Grade A canned vegetables rate higher in nutritive value than Grade C, that cheaper cuts of meat are less nutritious than more expensive cuts. Meat dealers in relatively low-income districts have experienced difficulty in selling utility sirloin steak even when it was unrationed and less than thirty cents a pound.

OTHER OBSTACLES TO BETTER NUTRITION

Obstacles to better nutrition other than income and relative prices include such things as food habits, cultural patterns, childhood training, and inefficient food purchasing, preparation, and management.

To a limited extent, unsatisfactory food habits may be the result of unsatisfactory arrangements for eating. Many school children and factory workers have poor diets because cold lunches are unappetizing, and in the absence of a suitable hot meal they consume undesirable quantities of soft drinks and candy. School lunches and in-plant feeding programs are needed, even though incomes are good and even though there are no so-called food surpluses. Furthermore, child feeding should be properly geared to the working hours of gainfully employed mothers. Feeding programs for preschool children at day nurseries and even late afternoon lunches at school for older children may be needed.

Education in choosing, buying, preparing, and care of food is a common answer to the way to better nutrition. Education should be seen, however, as part of a larger program. If unemployment is a basic cause of inadequate diets, an educational program including one which stresses how to get along on a low-cost diet may be worse than useless. It may stimulate bitter resentment if it is looked upon as a palliative, a substitute for efforts to get improved income.

It is also important to recognize the limits of education of a large part of the population and to take steps to improve the quality of food that will reduce the likelihood of wrong choice. It should not be assumed, because a college graduate who majored in nutrition can, at moderate cost, select an adequate diet from a given market supply, that a consumer-education program reaching adults through miscellaneous sources can protect consumers from the hazards of wrong choice, given market supplies and food habits providing ample likelihood to go wrong.

It also seems important to recognize that education directed to changing preferences is a long-time job; whereas a program to advise people on the relative economy of various accepted foods in a changing price situation is more likely to bring immediate effects.

OBSTACLES TO BETTER NUTRITION

In a changing world, custom and tradition are inadequate guides to behavior, and formal education is very important. Better educational programs evolve by knowing under what conditions past programs were effective or ineffective. A few guesses are presented as to the factors interfering with better nutrition education in the United States.

Nutrition education fails to reach large groups of people in the population, which fact has been stressed over and over again. The Agricultural Extension Service reaches all rural communities, but very little has been done in the urban communities.

Nutrition education is too exclusively directed to women in homes and children in school. Failure to reach all members of the family interferes with improved choice of food.

In too large a measure nutrition education is the product of the classroom and laboratory, untouched by the actual family behavior which has to be modified. Effective education must be based on a knowledge of existing food habits, prejudices, and emotional associations as well as family incomes, relative prices, purchasing practices, and methods of food preparation and service in the home. In most instances food habits do not need to be changed so much as they do to be modified. Often acceptable foods in changed quantities make an adequate diet possible.

At times the advice of nutritionists calls for a change when no change is needed. This tends to occur if food habits of the group reached are unknown to the nutritionist and her advice is given in terms of specific foods without basic facts about nutrients on the basis of which people can evaluate their own diet.

Nutritional educators are often met with a wall of incredulity. The conscious or unconscious response to the nutritionist may be, "It just ain't so." Nutrition is a complex condition, cause and effect relationships are mostly shrouded and remote, and nutrition is not the whole of life. Incredulity to the nutritionists' advice need not be altogether deplored; there are times when we rejoice that nature has provided people with some protective armor against the charlatan. It is, however, important to have some understanding of the reasons for this barrier against good nutritional advice.

High in the list would go the distortions, exaggerations, and adulterated truth in advertising, in which many of the essential facts have been skimmed off. The profit motive of advertising is well understood by the American populace. If education programs are not to be greeted with "Oh, yeah!" it is very important to keep them free from the influence of special-interest groups who want their products sold and want no comparisons made of relative nutrient value or cost unless these are wholly favorable to a specified product.

Overenthusiasm of faddists, who see adequate diets becoming universal by some simple change such as substituting whole wheat for white bread, eating more raw vegetables and fruit salads, drinking more milk, has undoubtedly been a factor intensifying incredulity. It has been stimulated also by findings of limited experimentation. Preliminary reports do serve to stimulate further research, but they may be too hastily accepted by advertisers and even educators and used to confuse rather than enlighten.

Claims or advice seeming to conflict create incredulity. So also does failure to get key leaders in communities to go along, to identify themselves with the advice. Many people feel that success in a nutrition program is dependent on co-operation of doctors.

The complexity of nutritional knowledge is also an obstacle to education. People are still somewhat dizzy trying to comprehend the already discovered vitamins and are being told that they are not through with them. A whole family of the amino acids is looming on the horizon. Furthermore, we are warned that we should anticipate a family of carbohydrates to be considered in planning diets.

Attempts have been made with the program of the "seven basic foods" to simplify nutritional advice. Tests are being made at the present time to determine how adequate the diets are which include these. Preliminary results show that very few of the diets considered adequate according to these general rules were actually adequate in nutrients.

A continued search must be made for simple rules that will guide choice without requiring people to have a great deal of highly technical knowledge. That is a major problem in nutritional education.

This discussion of obstacles to better nutrition despite a large supply of food has, perhaps appropriately, been directed to conditions in the United States, since it provides an outstanding example of a country with adequate supplies and a large percentage of its people inadequately nourished. However, most of the obstacles that exist in the United States probably have or will have their counterparts in other countries. Even where total supplies are inadequate, it will be important to develop an effective nutritional agency to cope with problems of regional distribution, improvement of qualities of foods, getting adequate foods to low-income families, and providing nutritional education.

MEASURES TO IMPROVE THE GROWTH OF THE DEMAND FOR FOOD

By E. W. GAUMNITZ[1]

MERELY increasing the demand for food does not necessarily result in better nutrition; yet, speaking very broadly, such should be the case. It is assumed in these observations that an increase in the demand for a particular food probably means an increase in demand for all foods. No attempt is made here to distinguish between high and low price levels as such or to evaluate the primary and secondary effects of given methods.

Some of the measures for increasing the demand for food may be outlined as follows:

1. Those measures inducing a "need" or a "want" for food. Education and information leading to a conviction as to the "plus" value or effect of given foods upon the well-being of the individual belong in this group. So do methods that improve appearance of products, appearance of package, the ease of handling, the ease of preparation, uniformity, storability, the degrees to which it supplements or blends with other products, and aids to quality or taste. Then there are measures resulting in the formation of habits which increase the "need" for particular foods. Eating habits established in school, in Army life, by rationing, and by absence or presence of given foods over a period of time, all have an effect upon habit formation. To these should be added measures resulting in larger requirements for food, such as type of work or relative activity—increased labor or exercise. It is probable that after a certain scale of production is attained, increased productivity per individual is likely to mean less necessary food per person and an increase in the demand for nonfood items.

2. Measures bearing on increasing the ability of consumers to purchase given foods. This includes the entire question of the income level and the probable duration of the level. It is enhanced by increased employment, at least under ordinary conditions. In addition, ability to purchase may be increased by supplemental features, such as contributions on the part of state or other outside agencies. Probably there should be included reduced costs and margins, though

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such factors would not meet the technical definitions. Availability should also be stressed, since an increase in demand without the product's being available would seem futile. Attention is thus directed to marketing facilities, including such items as refrigeration and transportation.

Some measures for increasing the demand for food can well be handled by industry. Attractive appearance of product or package, ease of handling and preparation, palatability, uniformity, nutritiousness, availability, lower handling costs, etc., are of this type. Companies and consumers have a common interest in these matters.

However, difficulties of handling underquality products, where the underquality is not readily detected, bring up questions which are more difficult—company- or industry-wise. Here the agencies of government have been and can be helpful. Careful administration on the part of public agencies is probably highly important, since industries are sometimes apprehensive lest such restrictions become ends in themselves.

Measures of an informational character present a more difficult field from a company or industry standpoint. How is the consumer to become convinced that the information is reliable? This raises the question of the desirability of rules or restrictions regarding company or industry information under the auspices of some type of trade or governmental agency.

Supplementary-income programs on the part of government, the supplying of food under various forms of relief, and the attempt to increase food demand through increased industrial activity involve such major political and economic questions as to require the broadest type of educational and analytical approaches.

OBSERVATIONS OF PARTICIPANTS

Margaret Reid (Iowa State College): If there is full employment, is there any excuse for a publicly financed nutrition program that does not focus on nutrition?

Howard Tolley (United States Department of Agriculture): If there is a surplus situation growing out of weather conditions, that surplus should be kept for the next year when the weather may not be so good. A publicly financed program should be used to get rid of other surpluses, whatever they may be. It should really focus upon good food of the right kind for the people who are not able to buy it.

John D. Black (Harvard University): Countries like the United States that have large potentialities of expanding food production have expanded in spite of all the restrictions of lack of labor and the like during the war. In the interwar years they expanded only a little. Why? Because there were no outlets. If there had been outlets, there would have been greater expansion. The war gave them outlets, and in spite of their handicaps they enlarged their output of food. The lack of outlets also kept prices low. If we now assure the farmers of the United States of adequate prices, the lack of outlets will not bother them; that will be the government's responsibility. Hence we may expect a great unbalance between food production and food consumption, if parity prices are maintained.

Theodore W. Schultz (University of Chicago): We are in the process of evolving an agricultural policy which can have only one ultimate result in respect to foreign trade, and that is to get us out of it altogether. Trade policy and what we have called "agricultural policy" are becoming increasingly inconsistent.

Mr. Tolley: Agricultural policy, as it has been developing, is tending to price us out of the world market quite rapidly.

Mr. Black: The only alternative anybody has suggested is export subsidies and simultaneous reduction of tariffs. We may have more foreign competition in our traditional export agricultural products than we had before the war. What will prevent the Australians and Argentinians and others from using export subsidies too?

Mr. Tolley: International collaboration of a kind we have not had heretofore, as distinguished from unilateral action, is required. As long as the United States tried to hold the umbrella over cotton prices for the whole world, the United States just had more than it could do. One thing led to another. Import quotas on cotton had to be evoked. We had to have a law that applied not only to cotton but to wheat and other commodities. Any time that imports threatened to upset this program of following out the declared policy of Congress, then the President could put on import quotas.

Albert G. Hart (Committee for Economic Development): The implication of what you are saying is that we should have international collaboration in trade control to permit the maintenance of a unilateral American policy, isn't it?

Mr. Tolley: Every country is going to have its own internal price policies.

Allan G. B. Fisher (Royal Institute of International Affairs, London): It would be very useful if Dr. Tolley would give us a more concrete picture of the devices that he mentioned with approval involving international collaboration.

Mr. Tolley: No one has the answers to that question. We need some *really new* economic inventions differing just as much from the device used in the past as the implements of war in World War I differ from those employed in World War II.

Mr. Fisher: The sort of program which was outlined for an international food and agriculture organization rests on two data: (*a*) the American farmers are very stubborn and very powerful and (*b*) many intelligent people know quite well that the policies that appeal to the American farmers are bad but they have become dispirited and defeatist about it.

Frederick V. Waugh (United States Department of Agriculture, Washington, D.C.): Nobody is prepared to offer in detail a proposal for an international stamp plan—yet it is not very hard to visualize a multiple pricing arrangement. We do not have the same price for wheat all over the world. We have all sorts of things that interfere with having a uniform price. It does come down to what Mr. Tolley called price management. Could we rearrange prices in any way to put prices more on the basis of ability to pay? The American stamp plan was intended simply to make some of the food surpluses available at lower price to people who could not pay a higher price. Could we not, in some degree, manage international prices to the same end?

Mr. Tolley: A hundred million bushels of wheat have been segregated from world supplies of the exporting countries to be used for relief after the war, to be given away by the exporting countries. It would not be a very big step from that to segregate some to be sold to China or India or Burma or somewhere else at half-price.

M. R. BENEDICT (University of California): The biggest objection to the two-price plan has been that it was a unilateral arrangement by the country that wanted to get rid of the surplus. Now if we could get a working arrangement or commodity agreement in which the consuming nations are represented along with the exporting nations, adjustments could be made along the lines of the preliminary arrangements we made under the International Wheat Agreement.

MR. SCHULTZ: The principal loss, as far as the United States is concerned, hinges on the fact that we have a price policy which gets out of both the domestic and the international market. Cotton illustrates this development. We have drifted into a price policy that has become a liability to agriculture's own interest. Even if agriculture were a pure monopoly, the policy would be shortsighted and costly.

MR. TOLLEY: One really big policy question to be decided, first, by the United States government is: Is the government going to let incomes of cotton farmers of the South drop and do nothing more for them, or try to enhance their incomes through manipulating prices or through income payments. We have three alternatives: (1) keep cotton prices propped up internally—sell abroad at world prices or agreed-upon prices, administered through some commodity agreement and with the Treasury absorbing the loss; (2) take all the props out from under the price of cotton, let the price go down to ten cents or twelve cents, and make good old-fashioned benefit payments to farmers of the South to get their income up to acceptable levels; or (3) have a two-price system internally—twenty cents a pound, for example, for cotton consumed at home and ten cents a pound for cotton to be exported.

MR. SCHULTZ: Alternatives 1 and 3 are essentially the same. The second can be modified simply: let cotton prices keep cotton moving into both internal and external markets and use whatever public funds that are needed on the income side for getting the cotton economy adjusted—payments that are designed to get our house in order in the cotton South over a long stretch. These payments, however, should not be of the old A.A.A. type.

MR. BLACK: Dr. Schultz, is your objection to the present price policy mainly to the fact that it establishes the general level of agricultural products too high or that it imposes a rigidity that interferes with desirable adjustments among lines of production?

MR. SCHULTZ: To a considerable extent both.

MR. BLACK: Could one reasonably ask farmers to accept incomes after the war at a level relatively lower than those that will prevail for industrial and urban labor? Farm prices are now 13 per cent above parity. Suppose the volume of agricultural production remains where it is and farm prices go back to parity. Farm income will have fallen off, roughly, one-fifth. Labor income is likely to fall about the same amount, due to loss of overtime and lower employment. Farmers certainly have a right to prices or to incomes that will keep them in the same relation to labor that has maintained in the last few years and cannot be asked to go back to the level that prevailed in 1935–39. Then the question becomes one, not necessarily of holding prices at parity, but of holding incomes at parity. How can we get farm incomes to parity without holding prices at parity? We might use such devices as subsidizing substitute lines of production—subsidizing dairy production in order to expand it in the South and coupling with this the disposing of the additional production outside the usual channels of trade. If the A.A.A. back in pre-war days could have been more flexible minded and could have gone all-out on a program of assuring the dairy industry of this country that it would not have burdensome surpluses, that if they developed as the result of the shift toward more forage crops and less corn, surpluses would be disposed of outside the usual channels of trade, the dairy industry would not have passed the Boileau amendments which forbade any increase in numbers of dairy cows.

MR. TOLLEY: If farmers could just feel sure that their incomes were protected—while they make the necessary adjustments—then the problem would be very much easier.

You see, it always gets back to this: We are either going to depend entirely upon the market place to make the adjustments and farmers are going to be entirely dependent upon what they get in market prices for their income; or we will depend on a lot of government interference to facilitate adjustments and to supplement farm incomes. At present, both farmers and legislators are more inclined to pass laws setting up price-support programs designed to enable farmers to get the extra income out of the market place—out of the price they get when they take their stuff to market—rather than from benefit payments or conservation payments.

JOHN B. CANNING (War Food Administration): Too much of the discussion is on the assumption of "full employment." It may be enjoyable to adopt optimistic premises and, reasoning rigorously from them, to draw comforting conclusions, but realistic science and human progress do not grow that way.

That hypothesis of "full employment" was not improper in the Western world a century ago when, to stay alive at all, it was necessary for a very large proportion of the whole population, able to work at all, to work close to the limit of biological endurance. It is still not improper for India, China, and other areas. Since the turn of the century, the hypothesis in the Western world has become progressively more illicit in economic science (as distinguished from word games of the mind).

It would have been proper to consider the dependence between two sets of variables: (1) the distribution of diet ingredients, income class by income class, and (2) the distribution of spending money among the population. In lieu of the "full employment" assumption, it would then be sensible to show the ways in which it is practicable to operate on the distribution of spending money (e.g., by altering the distribution of tax burden among income classes, by altering the variables in the Fair Labor Standards Act, by subsidizing the employment of aged persons, by changes in social security legislation, by public works policy, etc.). Corresponding practicable measures for operating on the other set of variables could have been brought to bear on the discussion also (e.g., the subsidizing of certain food items at some convenient stage, variants upon the ever normal granary programs to stabilize the annual farm-by-farm feeding of meat animals, dairy herds, poultry, and so on).

Working in such a way, economic scientists have a means of showing to the public what practicable ranges of choice, as among sets of consequences, are open to them. On a trustworthy basis thus laid, promoters of nutritional programs would have something solid to offer.

Mr. Benedict: Isn't there danger of stepping over the immediate future a little too lightly?

We are, as Dr. Schultz pointed out, tending to price ourselves out of the market. The situation in the next few years will almost certainly be one of accumulation of wheat, cotton, wool, and other farm commodities. The government is going to be forced to act (continue to buy), and this situation as it now stands looks like it will continue fairly well up toward 1950, under present legislation. That means that for a number of years we should have to think in terms either of some abnormal use of the commodities domestically or else of trying to find a device for moving them out of the country that would be satisfactory to the receiving country as well as to the United States.

FRANK W. NOTESTEIN (Office of Population Research, Princeton University): Before we blithely assume that we should be helping the poor nations of the world by sending them cheap grain, let us recognize that it could be dangerous unless there were a continuity of policy. In the existing situation population growth will nearly absorb increases in the food supply; and for people without fat on their ribs the sudden withdrawal of a substantial supply might precipitate a first-class catastrophe. Where continuity is required, I am suspicious of gifts motivated primarily by advantage to the giver.

O. H. BROWNLEE (Iowa State College): Why don't we start the analysis with the income necessary to induce farmers to provide supplies sufficient to meet demands, essentially the economic income necessary to bring about those supplies. Why can we not formulate definitions of incomes in economic rather than in purely ethical terms?

MR. TOLLEY: The income assumptions are not mine, they are the settled policy of the United States.

MR. WAUGH: This discussion raises a lot of doubt as to whether the economic equilibrium price is a just price, the kind of price we want. In the past people have not been well fed, and therefore we want greater food supplies. This means that farmers in the United States and in other parts of the world must have fair prices—prices somewhat higher than they have had.

At the same time, we realize, as economists, that the higher prices are, the more we will restrict consumption, and we are faced with an economic dilemma. We have to face that and recognize the need for adequate prices, adequate incomes to farmers, and yet at least some measures to handle surpluses in the market sense.

MR. SCHULTZ: There is something very fundamental brewing here that should be challenged in another way.

Quite point-blank I expressed a serious doubt about our price policy earlier. It is time to do the same thing about our income policy. We are likely to become parties to new political grief a decade from now if we indorse the belief that there is some historical formula that gives us the amount of income necessary for agriculture. We need to reconsider income in terms both of economic and of welfare criteria. We have already done a good deal of harm, on a professional level, in not having thought through what the income parity, as an income formula, may lead to in twisting and in misuse of resources; or how it would affect the welfare of farm people. It is likely to serve both criteria badly.

To illustrate: The wheat price in the United States today is around $1.50. This is largely a legislative price. We have no business in trying to hold this wheat at $1.50 with a crop of over one billion bushels and several hundred millions in Canada. Wheat is again being overvalued in terms of what it is worth to society. Meanwhile, look at what has happened in the last twenty years in wheat on the production side. Technology has advanced, fewer farm people are required, from one-third to two-fifths fewer people are farming in many of the wheat counties. Leading farmers of Oregon and Washington, on their own account, are saying if wheat were priced at 10 per cent above corn they would really be in a strong competitive position costwise for the long pull. (Wheat is worth about 10 per cent more for feeding purposes than is corn.)

You cannot get the answer for wheat by looking either at a price parity, based on 1910–14, or on some more recent date. Nor can we get the necessary price of wheat by looking at some income formula. The first does not stand up when tested against criteria for allocating resources, and the second is not supported by welfare criteria.

MR. TOLLEY: A big job which the economists of the country—agricultural economists and food economists especially—can take on, and I think should take on, is to make real honest-to-God analyses of the economic consequences of various courses of action that are being considered.

LAMARTINE P. YATES (United Nations Interim Commission on Food and Agriculture): The United States has to face the possibility of a surplus of farmers. For how many people shall prices or income be guaranteed? It is impossible to make calculations on the basis of some previous year's population for the present number of farmers.

MR. FISHER: If one asked what is the most important obstacle to better nutrition, the answer would be the fact that the vast majority of the world population have such small incomes. The most important obstacles (certainly in the poorer countries, which do not enjoy the numerous benefits of the people of this country) are to be found in the various factors of one kind or another which prevent people from earning higher incomes than they have had in the past.

What, then, are the most effective measures for stimulating the growth of demand for food? Historically the most effective measures have been those which insure that people should have higher incomes; it is surely of very limited significance to consider devices for inducing people to drop buying something and substituting something else for it. Many of the other ideas that have been mentioned have their place, but I think it is rather a pity to list them as if they were of the same importance, especially if one is thinking, as we ought to be in this series, of food in international relations.

MR. CANNING: The more nearly equally the income of the population is distributed, the greater the proportion of it that is expended for food; and, in general, the nutrition improves with improved spending for food. Therefore, it may be desirable to bring about something of a narrowing of the dispersion of incomes. At the present level of governmental operations and of governmental financing, a fairly large portion of the apparent cash income of the lowest-income groups is merely absorbing tax burden. If you take away half of an income of ten thousand dollars a year for an ordinary-sized American family, you will not damage its nutritional status at all, but take away anything whatsoever from a family income of twelve hundred dollars a year, and you damage its nutrition.

A. C. BUNCE (Federal Reserve Board): Essentially, then, Dr. Canning advocates the repeal of sales taxes of all kinds and places taxes largely on income. Equalizing incomes does not go far enough. The thing we have to face—and this is what Mr. Fisher is constantly hitting at—is that we must increase income in such a way that we actually produce a great deal more. Fundamentally, the basic solution of the problem of nutrition and agriculture lies within industry and industrial production.

MR. FISHER: Improvement of nutrition should not be an accidental by-product of programs for raising farm incomes but an inevitable by-product of programs for raising incomes in general.

MR. SCHULTZ: We have reached the stage in Western countries—certainly in the United States, to a large extent in Canada and most western European countries—where people by their own preferences have a very low income elasticity for food. Even with rising incomes, confronted with a preference scale in which people allocate their own incomes as they become richer proportionately against food long before they have solved their own nutrition problem, what is to be done?

MR. FISHER: Surely, the main reason why your nutritional standards have risen is because you have a larger proportion of people earning incomes larger than they were getting four or five years ago.

MR. BENEDICT: Is that true when you consider how much cheaper food was during the earlier period?

MR. TOLLEY: This raising of the general level of income is necessary.

MISS REID: It seems to me that nobody is going to quarrel with the statement that the best thing that could possibly happen is to use our productive resources more efficiently and have a somewhat greater increase in the incomes at the bottom than at the top. That will contribute to better nutrition. Certainly, there would not be much of a problem of surplus disposal or any issues that raised questions about the relation of such programs to nutrition if we had full use of productive resources and something approaching a fairly good distribution of income; but the likelihood is that we are not going to have those things, and therefore it is necessary to give consideration to some of the other programs.

MR. BENEDICT: Merely getting more income and a better distribution of income would not result in universal good nutrition. There is a great deal to the point that Dr. Schultz has suggested. We have the tremendous influence of prestige and social competitiveness in the purchase of other things than food. By no means all the people who could afford good diets have them, even where they may know what they are. We do have this desire for a better car than the neighbor has or for better clothes or for more entertainment, supported by the advertising activities of the people who sell those things. We had a chance to observe that during the thirties in the very large relief problem we had in California. It was found absolutely necessary to insist that people spend the public contributions for necessaries.

MISS REID: Even with something approaching full employment there still will be low incomes and poor nutrition. In the American economy there would be a good deal of resistance to any kind of a nutrition program that makes distinctions between people on the basis of income. It is a very great obstacle to a large-scale food-stamp plan.

MR. WAUGH: One way of approaching this problem would be to have no distinction between families—some way to subsidize certain foods. But it is much more expensive to subsidize the entire supply of a certain food than to subsidize a certain part of the population. By spending a certain amount of money to supply food to *all* families you get less nutrition than by spending the same amount of money to supply food for *part* of the population. Another difficulty is that all surveys show that low-income people eat less of almost every single food than higher-income people. How, then, would one select the foods?

MISS REID: Bread and potatoes.

MR. WAUGH: Yes, bread and potatoes should be on the list, but you can take almost every other food except oleomargarine and fatback and you will find that the low-income people are eating less of everything than they need and less than they buy when their incomes go up a little.

A good many people do not prefer to buy utility beef, for instance. If we could purposely exaggerate differentials between grades, that would be one thing that would be worth some consideration. There is the tendency for even the lowest-priced stores purposely not to handle the lower grades. They like to handle top grades, like to advertise that they handle only top grades. A little subsidy not only to educate people to the fact that most of these lower grades are not *just as good* nutritionally but actually to make it more of an inducement both to the stores that handle them and to the people who buy them.

MR. BLACK: Sometimes we make a little too much of the objection to classifying the population. The school lunch program in general has been handled in such a way as not to raise such difficulties. The in-plant feeding program is also being handled in such a way that it is not raising this question of discrimination. Probably preschool and infant feeding can be worked out so that it will not raise it. This leaves out certain low-income families. Suppose we offer the stamp plan to such of these as will ask for it, so that it becomes entirely a voluntary matter. Will not this take away some of the objection?

Just one other point: We have talked here about the importance of raising the incomes of low-income people and of equalizing incomes. Are we not inclined to overlook the fact that we have done a vast amount of this already? First of all, we have made education equally free to everybody, and education costs a lot of money. Similarly, our roads and streets, police protection, health protection, fire protection, and some public utilities are free to all, and, more recently, social security has come along. This makes up a large bill of additions to income that modern society is now providing equally across the board. When someone comes along and proposes to add to the list a few foods needed to bring diets up to a safe level, we encounter a tremendous psychological obstacle in the minds of many people, including some of the men in this room. Yes, the obstacle is principally a psychological one.

E. TWENTYMAN (British Food Mission): It is surely a very important subject to which this conference is addressing itself. I confess to be disappointed that the discussion has been confined to measures that can be taken inside well-advanced nations and has had no real bearing on the international problem to which, as I understand, this conference is addressing itself. It is very necessary for us to recognize that the essential method by which the effective demand for food can be increased is by increasing the productivity of people who are now without the ability to make their demand for food, and that means that measures must be taken in other fields than that with which this group is concerned. Measures must be taken in regard to international trade practices, international lending, and a great many other things. The essential conditions under which the purposes that were set forth at Hot Springs can be achieved lie outside the food and agriculture group, and unless those measures are effectively taken, no considerable progress can be made.

MR. BUNCE: One of the basic problems is to make the tremendous food resources of the Western Hemisphere available in some way or another to the areas of the world where there is much greater malnutrition and shortage of food than is present here or in Europe. We have within the United States and in the Americas the greatest area of relatively abundant resources in terms of intensity of use and in terms of density of population that there is in the world, possibly with the exception of some areas of Russia.

Unless we can, at the end of this war, provide the mechanisms and the means of exchange by which the abundant resources of the white races can be made available to the people of the colored races, including India, Africa, China, Japan, and Mongolia (and probably associated with them that queer mixture of Asia and Europe—Russia) we will not have laid the foundation for a permanent peace.

MR. YATES: We have to face the fact that it is comparatively easy for the advanced Western nations to become richer and more prosperous. It is immensely difficult for the poorer to become less poor. The problem is how to put part of our resources at their disposal so that in due time they may stand on their own feet, with their own resources.

MR. BENEDICT: The basic problem is to increase the ability of those people to be productive, but that is not quite the same thing as making the resources of the Western Hemisphere available to the other parts of the world. That comes down to the question of either enabling them to produce something to trade for food or else of giving it to them. It is hard to see just what they can produce on a scale that would warrant evening up food supplies without outright gift. That would seem to throw the emphasis onto efforts to increase the productivity of other countries in food. It seems to me they are needing both some capital goods and a good deal of technical assistance.

PAUL R. CANNON (University of Chicago): What about the tendency of people to breed up to their food supplies? Could Dr. Notestein tell us any more about the techniques, for instance, in India and China whereby eventually this problem of overpopulation might be corrected?

MR. NOTESTEIN: The difficulty in making an answer is that the solution is neither simple nor certain. There are no panaceas. Birth control, for example, cannot be successfully introduced in the absence of other changes. The control of fertility requires a reversal of goals from those centering on the perpetuation of the family to those centering on the health, material well-being, and opportunity for advancement of the individual; and it requires the obsolescence of the social equipment (customs, moral codes, etc.) that maintains the existing goals. Such changes require less emphasis on family and more on the individual, less emphasis on status and more on change.

The social-economic ingredients are fairly clear. Probably nothing would help more than rapid urbanization and industrialization. However, popular education, growing political participation, improved health, active birth-control propaganda, rising levels of material welfare, weakened caste and class lines, all would help stimulate parents to new aspirations for themselves and their children—aspirations that are incompatible with large families. Even such changes would not bring quick results.

Growth can be promptly stopped only by a rise in mortality, which in all probability would further postpone the decline in fertility and solve no problems, present or future. In other words, there is no practical hope for a quick exhaustion of the growth capacity of Far Eastern populations. On the contrary, if my analysis of the factors governing fertility is correct, growth capacity can be exhausted in the long run only by a course of events that will stimulate increase in the short run. The prescription amounts to one of balanced modernization—social, economic, and political; the prognosis remains doubtful.

One further point should be made. Trends toward lower fertility developed in the Western world and in Japan within the framework of modern urban industrial communities and in a context of rapid growth. India and China will have great difficulty in urbanizing and industrializing as rapidly and in absorbing such growth. Therefore, we have no complete solution. We do not know how to reduce fertility in an essentially rural culture. The solution of that problem is of critical importance. I believe it can be best approached through the field of public health, by attempts to substitute interest in the healthy survival of children for that in having many children. Of all Western groups, those concerned with medical problems in the Far East seem to me to be in the best position to help. Unfortunately, they appear to be among the most poorly equipped to attack this problem in terms either of interest or of appropriate professional training.

A. J. CARLSON (University of Chicago): Are they missionaries first and doctors second?

MR. NOTESTEIN: One finds physicians doing extraordinarily effective jobs in utilizing social and anthropological techniques to attack problems of epidemic control and nutrition, in finding indirect solutions to problems that cannot be directly attacked. When it comes to the intimate relation between fertility and health, they are inclined to throw up their hands. Obviously, the problems are more difficult and obviously also their education has not been one to develop either their interest in the problem or their ability to attack it. The taboos of the profession on birth control, here and abroad, illustrate the case. We have done relatively little work in this field, in spite of its obvious medical importance. Still less attention has been given to the more important matter—the means by which values centering around the large family may be deflected to those centering around the development of the individual human being. The field of health would seem the obvious place to try.

LEROY D. STINEBOWER (State Department): Whether better nutrition is approached directly from the standpoint of improving the efficiency of agricultural production or whether we approach it from the standpoint of improving the level of income, we quickly come back to the problem of industrialization of these areas, because one of the restraining factors in many areas of the world to increasing agricultural production is the inefficiency of the land-tenure system, the man-land ratio that is involved in agricultural production, and the need of moving considerable numbers of the population off the land in some of these areas.

MR. SCHULTZ: That holds also for the less populous countries. Brazil, for example, as it industrializes (a relatively new country of only forty-some millions of people), it will in the first stage actually export less food. More food will be required within Brazil. But as industry takes hold and the processes work through culturally, you get what Dr. Notestein has outlined; and agriculture will also improve, at some subsequent period quite rapidly, and again bring about a surplus in food for that country. It is very important to understand the sequence of these events and how industrialization ties into them.

To go back to the question of income. No one has suggested any way by which we can make assets out of the flows of food that will be forthcoming in what appears to be great excesses for, say, the next decade or two. If we could divert the resources quickly to other things, that would be an answer; but they cannot be diverted in the course of a few years. How can we use this extra food?

We are saying that to get the higher incomes in country X you have to industrialize; but, at best, that takes many years.

MR. FISHER: You could generate a normal demand for a considerable part of these apparent surpluses by industrialization or other methods of raising incomes in different parts of the world. It is possible that would not do the trick, either, completely, and then you would have all your supplementary devices.

MR. SCHULTZ: What you can do, however, may be to transfer resources out of agriculture, which has not been stressed.

MR. FISHER: Would it not be a good idea to shift some of the resources out of agriculture in this country?

MR. SCHULTZ: We have not talked of that alternative at all, and it seems to me one of the most important.

MR. BUNCE: Many of the low-income areas, including both Europe and the Orient, have a tremendous need of large initial expenditures for capital goods of numerous types, including transportation equipment, factory equipments of all kinds, machine tools, and so on. But with their present very low productivity, they have little which they can ship in return. Is there any means that we can use of bridging this gap over time so that we can make available to them the capital goods in the large quantities that they need, on such terms that it will be possible for them to repay us so that they will not have to be a gift?

MR. FISHER: Historically, the early steps which have preceded the movement from poverty to relative wealth have usually or very often involved the accumulation of capital by all sorts of rather disreputable means. In more recent times, in the Russian case, capital has been accumulated at the cost of very great suffering for the people who were forced to save.

MR. BUNCE: India is now in a particularly good position.

MR. FISHER: That is an interesting parallel of saving enforced on the Indian people; but if we want to do it by smoother methods, the answer is to try and build up institutions for regulating the flow of capital that will take a longer view of the return they are likely to get than institutions in the past have usually been able to do.

MR. BUNCE: What would the cost be to the United States as a whole of making capital loans abroad, if by so doing it could lessen unemployment or relief payments?

MR. STINEBOWER: We may easily overstate the amount of international capital movement that is necessary to bring about a very considerable degree of industrialization. The capacity for capital formation in a modern industrial society is extremely large; but it is also surprisingly large, under appropriate and favorable circumstances, in a country which is industrializing itself.

Japan, of course, industrialized at a rate much more rapid than England did when England moved into the industrial revolution. The figures on Japan are extremely interesting because most of Japan's capital accumulation was domestic capital accumulation; it was not foreign borrowing. It did "borrow" a large part of its industrial techniques, but actually the amount of foreign lending was extraordinarily small and was almost exclusively confined to governmental loans and some utilities. There was very little foreign investment in the growth of the Japanese merchant marine and Japanese industry. A little sweetening does a great deal for a country when the circumstances are favorable.

It would appear that conditions are less favorable for China to repeat this experience than they were for Japan. For India one cannot be so sure. But they probably are not so favorable for rapid industrialization as they were in Japan, yet more favorable than they are in China; and certainly there is much more will on the part of the government to industrialize India rapidly after this war than there is even in China.

This process is not necessarily so slow as it is sometimes assumed to be, because the lines on which countries ordinarily start industrializing now are not the heavy industries, which are long, round-about processes and take a long time to start creating the means of repayment of capital; they generally are the more direct-consumption goods. Textiles is nearly always the first industry in a country; and, following that, they move on to other consumption goods, the construction period for which is relatively short and the returns for which begin flowing in immediately.

HENRY C. TAYLOR (Farm Foundation, Chicago): Did that rapid industrialization of Japan relieve the pressure on the land?

MR. BUNCE: The population of Japan doubled during the period from 1850 to 1930, and actually the cities in Japan were built up by a tremendously rapid increase in population which followed about five centuries of a practically stable population. Actually, the pressure on the land was not relieved at first by industrialization; but, following industrialization, there came the desire for a higher level of living and other things that compete with the size of the families.

MR. NOTESTEIN: The rural population has scarcely changed since 1920. The cities have drawn off the natural increase. This increase was large. Between 1920 and 1935 the proportionate increase of population in Japanese cities of 100,000 and over was as large as that which occurred in the United States between 1900 and 1940.

PART V

INTERNATIONAL RELATIONS

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POSTWAR TRADE POLICY

By PERCY W. BIDWELL[1]

TO DEAL with the postwar food problem it is necessary (1) to know what kinds of food the various peoples of the world need and in what quantities, (2) to arrange to get the necessary food produced, and (3) to get it into the hands of the consumers. It is the last division of the problem—the task of distribution—that interests us now. Distribution or marketing is, of course, intimately related to production; for a large share of the world's food supply—cereals, dairy products, beef, and pork—is produced in specialized agricultural areas, with the expectation of sale to distant markets in industrial regions. When those markets are booming, food production is stimulated; when hard times afflict industrial countries and when to this handicap high tariffs are added, then an economic blight falls on the food-producing areas.

Specialists in nutrition, those who are interested in what has been felicitiously described as "the marriage of nutrition and agriculture," are keenly aware of the part which international trade must play in the success of their farsighted plans for raising standards of food consumption in the world. They know that the high import duties, import quotas, milling requirements, and other devices employed before the war in western Europe (France, Holland, and the United Kingdom, as well as Germany, Italy, and Spain) raised the prices of bread grains in those countries in some cases to over twice world-market prices. Domestic production was expanded in high-cost areas; domestic consumers, forced to pay more for their cereal foods, had less to spend on protective foods. But the injurious effects of these tariffs spread far beyond the borders of the states which imposed them. Farmers in our own northwestern states, as well as in Argentina, Canada, and the Danubian basin, found their incomes cut by the loss of markets in western Europe.

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TARIFFS AND NUTRITION

Agrarian tariffs make it impossible to grow the maximum amount of wheat where wheat grows cheapest or to raise or feed the maximum number of head of beef cattle in those areas where cattle can best be raised and fed. Tariffs raise food costs. Thus restrictions on international trade in food are obstacles to the realization of plans for raising nutritional standards. The success of such plans must depend not only on finding out what are the best foods and on discovering the best agricultural techniques but also on getting food produced in maximum quantities where it can be produced with the smallest expenditure of labor and capital.

The scientists, economists, and statesmen who are interested in better nutrition should not concentrate their attention entirely, however, on lowering trade barriers on foodstuffs; they must take a look also at industrial tariffs; for it may well be that the food consumption of the Belgian coal miners or the French textile operatives, after the war, will be as much influenced by the level of industrial tariffs—in their own countries, in this country, and all over the world—as by the Belgian tariff on butter or the French duties on wheat. This may sound paradoxical, but, in truth, it is very simple. The industrial workers of any country live by exchanging the products of their labor, whether it be coal, iron and steel, or textiles, for the foodstuffs produced either in their own country or abroad. Lowering tariffs on Canadian wheat or American lard or Argentine beef will do European workers no good unless they can buy the supplies which are now more freely available, and their buying is made possible only by the export of European industrial products.

Take for illustration the postwar situation in Germany. It has been proposed that the victorious Allies should insist that the German restrictions on imports of grains and other food products should be abolished after the war. This proposal has two objectives: (1) destruction of the social and political power of the Junker class, the great landowners east of the Elbe, and (2) laying the basis for a sound economic recovery in Germany. But the obvious objection is: "How will the Germans buy foreign cereals or meat? Where will they find markets for their exports of manufactured goods which will yield them the necessary foreign exchange?" The same question will be raised by the English, the French, and the Italians when we ask them to cut down their excessively expensive wheat production. And there is only one satisfactory answer: The foreign exchange can be obtained only by opening wider foreign markets for European manufactures. Thus we are brought to the logical conclusion that international trade is indivisible. If our prime object is to get better nutrition by stimulating freer exchange in foodstuffs, then we find ourselves forced to widen our program to include the expansion of all types of international trade.

HOW CAN TRADE BE EXPANDED?

In expanding international trade it is important to emphasize the effects of tariffs. But that should not be taken to imply an overemphasis on this aspect of international economic relations. We shall certainly not be able, particularly in the disturbed postwar years, to set in motion the flow of trade on a large scale simply by taking down tariffs. Co-operative action in the field of relief and reconstruction will obviously be necessary. We shall need an international agency to assist in stabilizing exchange rates. In the industrially undeveloped countries large investments of capital will be necessary to raise the productivity of labor and thus make possible larger purchases of both domestic and foreign goods. But none of these plans for *international* action can accomplish their purposes in a world where markets remain *national.* The deficit countries who borrow from the stabilization fund can get out of the red only by getting an export surplus, either in goods or in services. So also the countries that borrow on longer terms through the world bank can service their loans only if the rest of the world is willing to open its markets to their products. Thus the freeing of international trade is a necessary supplement to all measures of international economic co-operation.

PROSPECTS FOR TARIFF REFORM

Many sincere advocates of closer international co-operation are at present discouraged about the prospects for reducing tariffs. Superficially, it is true that the record of the interwar period gives ground for a defeatist attitude. It was found impossible in the years after 1918, despite the persistent efforts of high-minded and intelligent public servants in every country, to free international trade from the restrictions imposed during the first World War. Instead, the disturbed conditions of the immediate postwar years produced a new crop of quotas, prohibitions, and restrictions. Toward the end of the twenties the outlook for freer trade brightened, and the World Economic Conference of 1927 set in motion a trend toward lower tariffs.

But the world-wide business depression of 1929 reversed that trend. Higher rather than lower tariffs were the remedy employed by practically every country for unemployment and falling prices. This country set a bad example in the Hawley-Smoot Act of 1930; the United Kingdom followed by going over to protection in 1931 and 1932. Then, within a few years, the growing political insecurity in the Far East and in Europe gave added reason for maintaining trade restrictions.

THE INTERWAR PERIOD

But the backward glance need not be discouraging. History is depressing only to those who falsely believe in some inevitable cycle of repetition of the past. We can now see that the failures of that unfortunate period could have been avoided.

Mistake No. 1.—Those who were seeking to restore the international economy after World War I regarded tariffs as primarily the *causes* of bad relations between countries when they were probably more significant as *symptoms*. The central European countries did not maintain their export prohibitions, England did not introduce safeguarding of industries, nor did we jack up our tariff in 1921 and 1922 out of stupidity or pure "cussedness." All these countries, including our own, were acting to protect what they considered vital national interests. If they acted foolishly, it was largely because they were afraid and because no wise plan of joint action had been prepared in advance. Fighting was still going on in Europe in 1922, so that continued control of imports and exports seemed to some countries a necessary measure of political security. We, in this country, were afraid of unemployment resulting from excessive imports. It was, in fact, unreasonable to expect that any government would consent to lower its tariff barriers until it felt assured of some measure of political and economic security.

Mistake No. 2.—Another disappointment of the interwar period was the failure of the Allies in World War I to lay their plans for postwar reconstruction early enough. Even during the war, economic cooperation among the Allies had been established only in partial manner and after great delay. The Paris Peace Conference gave little attention to the restoration of trade and financial activities. It disregarded almost entirely the third of President Wilson's Fourteen Points, which called for the removal of economic barriers and the establishment of equal treatment in commercial policy. In the absence of some mechanism for joint action, each national state was forced to combat the evils which beset it with the weapons nearest at hand, i.e., with controls over foreign trade and foreign exchange.

Now it looks as if we were determined not to repeat these errors. We are already attacking postwar economic reconstruction on a wide front. The United Nations Relief and Rehabilitation Administration is already a going concern. Recently, at Bretton Woods, representatives of forty or more countries discussed plans for two international institutions, the International Stabilization Fund and the World Bank. Leaders of public opinion in this country, in England, and in Russia have kept before their peoples the necessity of maintaining political security if we are to achieve an advance in economic welfare. Hence, at Dumbarton Oaks, representatives of the Department of State discussed with English, Russian, and Chinese officials the establishment of a world security organization. Many more instances might be cited showing how much further we have advanced in planning for postwar security, political and economic, than we had before the conclusion of World War I. Not only have responsible officials given much more attention to winning the peace but, in addition—and this is of great importance—active discussion on the radio and in the newspapers has stirred interest in the subject throughout the country. Much more needs to be done, however, before a broad basis of popular support will have been laid in this country for the proposed new international institutions.

A NEW POLICY, ADAPTED TO NEW CONDITIONS

In planning commercial policy for postwar years it is not enough simply to avoid the mistakes of the past; we must fix our attention on 1945, not on 1919. We must devise methods of international co-operation which will be adapted to deal with the *new* conditions prevailing at the end of *this* war. We must take into account, first, the commitments made by responsible officials in the United Kingdom, in this country, in Canada, and elsewhere among the United Nations to initiate measures to provide full employment after the war and a rising standard of living. Millions of soldiers and civilians have taken these promises to heart; they are "the substance of things hoped for," the anticipated reward for the blood, sweat, and toil of long years of war. This is the first red light which shines on the road of postwar foreign-trade policy; the people of democratic countries will tolerate no measures of tariff reform that threaten to diminish employment.

Full employment is the slogan of postwar planning in the countries of mature industrial development; but in areas where manufacturing has been more recently introduced the battle cry is "industrialization." Brazil, India, and China are looking forward to keeping intact many of the new industries established during the war and adding others. Thus they hope to raise the productivity of the labor forces now occupied almost exclusively in extractive industries. As a means of protecting new industries against foreign competition, national governments will naturally turn to the familiar device of import tariffs. For them, tariff reform may mean raising, rather than lowering, the barriers to trade. This is the second red light. A United Nations agreement on commercial policy must take into account demands both for full employment and for industrialization; it must also be adapted to the specific postwar needs of three great countries—the United States, the United Kingdom, and the U.S.S.R.

It is now a well-established principle, applicable to all postwar planning, that leadership must be provided by a small group of nations willing to accept the responsibilities that accompany great economic and political power. The United States, the United Kingdom, and Russia have already taken the lead in United Nations conferences on relief and rehabilitation, on monetary stabilization, and on political security. We have no reason to expect any substantial progress in expanding international trade unless these three countries can first come to agreement. The primary task, therefore, in attempting to formulate a commercial policy for the United Nations is to explore the areas of conflict among these great powers and to see how these conflicts may be resolved.

TRADE POLICIES OF THE UNITED STATES AND THE UNITED KINGDOM

Both of these countries will be confronted after the war with serious disequilibriums in their balances of payments. In this country we may expect a huge surplus of credits arising principally from a great excess of exports. The English balance of payments will be strongly out of balance in the opposite direction. Having lost a large portion of her invisible exports, through the liquidation of foreign assets, losses of shipping, and loss of foreign markets, the United Kingdom will be hard put to it to pay for even essential imports. This situation explains the strong support for schemes for increasing British exports and restricting imports, for cartels, bilateral trading, imperial preferences, and export subsidies—all of which run counter to long-established American policies. We oppose equality of treatment to the discrimination which is inherent in bilateralism; cartel agreements we find difficult to harmonize with our anti-trust policies; we ourselves have dabbled somewhat in export subsidies and preferential tariffs, but in general we are against them. To reconcile these differences so that the United Kingdom and the United States can work together for expansion of international trade must be a major objective of postwar commercial policy.

TRADE POLICIES OF THE UNITED STATES AND RUSSIA

Russia's foreign trade is in the hands of a government monopoly. All importing and exporting consists really in purchases and sales for government account. Under these conditions import tariffs and other familiar landmarks of commercial policy, so important in relations between free-enterprise countries, lose their significance. For example, what guaranties of equal treatment can Russia give to free-enterprise countries? How can such countries protect themselves against Russian dumping?

One obvious solution for dealing with both the United Kingdom and Russia is to abandon our principles and adopt theirs. We could meet British cartels by authorizing our exporters to participate in them or, perhaps, by organizing bigger and better cartels of our own. We might abandon most-favored-nation treatment and sew up the Western Hemisphere countries in a series of strictly bilateral agreements. We might organize government corporations to deal with Russian state monopolies. But the net result of this adaptation of our policies not only would be the sacrifice of principles upon which we have long insisted; we should also lose the principal objectives toward which we are directing our postwar policy, viz., the expansion of international trade, the preservation of a large degree of free enterprise in our own foreign trade, and the maintenance of friendly relations with all nations.

The essence of the difficult problem before us is to find some type of agreement which will satisfy the basic foreign-trade needs and protect the national interests, ideological as well as economic, of all three countries—the United States, Russia, and the United Kingdom. The United Kingdom needs opportunities for a large increase in exports. If English manufacturers could look forward to prosperous markets all over the world, freed from excessive tariffs, quotas, exchange restrictions, and the like, they could dispense with attempts to obtain preferred treatment in particular markets through cartels, bilateral arrangements, and preferential tariffs. Naturally, the English set great store on the reduction in the high rates imposed by the Hawley-Smoot tariff on their quality products—fine china, leather goods, high-grade woolens, and cotton goods. They would be glad to conclude a new trade agreement with us with reciprocal reductions in import duties. But even the most drastic reductions permitted under the Trade Agreements Act would actually not help very much to meet the deficit in the British balance of payments. That deficit may amount to as much as $800,000,000. Even in a good pre-war year, English exports to the United States were only 6 per cent of the total; a 50 per cent increase in American purchases would fall far short of closing the gap. (Also, under our present system of tariff bargaining, we should expect to increase our sales to English markets. The resulting increase of English imports would cut down their net gain.) The truth is that England's trade is world-wide; what England needs is not concessions in single markets but an opportunity to expand in all markets. Only then will the English businessman and political leaders feel safe in giving up those special arrangements with Argentina, Canada, and Australia which we find so obnoxious.

Russian postwar trade policy is a matter of great concern to the free-enterprise economies. It often has been assumed, and falsely, that a planned economy like that of the Soviet Union must necessarily pursue an autarchic policy, reducing its import and export trade to a bare minimum. It is true that in the interwar period under the Soviet regime Russian trade amounted to only a small proportion, less than 3 per cent, of the world total. But this period was exceptional; in postwar years there seems good reason to look for a very considerable expansion in Russian trade. A dominant purpose of Soviet national policy will be to expand the program of industrialization which was interrupted by the war, so as to raise the living standards of the Russian people. Industrialization means accumulation of capital. In the Five Year Plan the Russians themselves produced most of their capital equipment, their machinery, and installations of all types, but this was accomplished only at the expense of postponing the production of much-needed consumers' goods. After the terrible sufferings which the Russian people have undergone in this war, their leaders will want to avoid repeating the painful process of forced saving. They will endeavor to borrow their capital equipment abroad so as to free as much labor as possible for making houses and house furnishings, clothes, soap, and the innumerable items of consumers' goods that the Russian people so desperately need. Soviet missions have already been exploring the possibilities for large purchases in the United States and in England. They are talking, if we can believe newspaper accounts, in terms of billions of dollars worth of machinery for the rehabilitation of Russian agriculture, industries, and transportation system. Russian purchases in the first three postwar years have been estimated at ten billion dollars. It is not impossible, if these estimates should prove correct, that Russia might prove the greatest single market for American exports. Such exports would, of course, involve the granting of large credits; they would mean also that eventually the rest of the world, including the United States, must be prepared to import liberally from Russia.

The enlargement of Russian foreign trade, if proper policies are adopted, may be made the means of the enrichment of all nations, as the resources and skills of that great nation become available through international exchange to other peoples. But serious problems of commercial policy will also arise in trade between a planned economy and a free-enterprise economy. Briefly these questions are two: (1) How can a free-enterprise economy be protected against the abuse of the monopoly power which Soviet purchasing agencies might wield? (2) How can a free-enterprise economy protect itself from the dumping of Russian exports in its markets?

RULES FOR TRADING WITH RUSSIA

Thus far the United States and the United Kingdom, the leading free-enterprise countries, have regulated their trade with Russia on a bilateral basis. We grant Russia most-favored-nation treatment; Russia in return promises to purchase a stated value of United States goods annually. An agreement of this sort is at best a temporary stopgap. It may serve its purpose as long as Russian trade is an insignificant factor in total world trade, but it would afford no adequate protection to a free-enterprise economy should Russian trade undergo rapid expansion.

The Russo-English agreement of 1934 provides for an approximate balancing of trade in both directions. This is bilateralism, pure and simple. Agreements of this sort tend to restrict the volume of international trade; furthermore, they are not consistent with the principle that all countries are entitled to equal treatment. For example, suppose that England has been in the habit of importing goods to the value of $70,000,000 from Russia and exporting $50,000,000. A bilateral agreement is made which balances the trade at some intervening figure—say, $60,000,000. Certainly, England could not expect Russia to step up her purchases by the full amount of the difference. But even an increase of $10,000,000 in Russian imports of British goods may mean that, in order to satisfy England, Russia has to cut down purchases from some other country, perhaps from the United States. Should all the free-enterprise countries, lacking any better device for dealing with a planned economy, enter into bilateral agreements with Russia, we might soon witness the disappearance of the principle of nondiscrimination and also the collapse of all hopes for a general world-wide expansion of international trade.

THE NEED FOR A MULTILATERAL AGREEMENT

The only practicable alternative to bilateralism is multilateralism. If trade is to serve most effectively its great purpose of adding to human welfare, it must not be artificially channeled between pairs of countries; it must flow freely according to differences in costs and prices. That means that the conditions of trade, the rules which govern trading, ought not to be fixed by each country for itself, or even by pairs of countries, but by general agreement of all trading countries. This principle of multilateralism has already been recognized in all the new ventures in postwar collaboration, in the establishment of U.N.R.R.A., and in the preparation of plans for an international stabilization fund and a world bank. The same principle should be adopted in planning postwar commercial policies.

Specifically, what is needed is a general agreement among all the great trading nations pledging each to the simultaneous removal, or reduction, of barriers to import and export trade. The agreement should provide for the abolition of prohibitions and quotas and for the all-round reduction of protective tariffs. Exchange control, an effective means of checking imports, we shall assume will be taken care of in the agreement which sets up the international stabilization fund.

Quotas and tariffs are the core of the whole system of trade restrictions. But on the margin of the protective system of every country is a variety of laws and regulations which often make the business of importing and exporting unnecessarily difficult and costly. Hence the multilateral agreement should provide for the simplification of customs formalities and for the abolition of all forms of administrative protectionism; it should prescribe uniform legislation regarding dumping and unfair competition in international trade. All countries participating in the agreement should guarantee each other equal treatment in all matters affecting foreign trade. This guaranty should be interpreted to mean the abolition of preferential tariffs, including special tariff arrangements between a metropolitan area and its colonies. To watch over the observance of the terms of the agreement, to interpret its provisions, and to hear and pass upon complaints of nonobservance, the participating countries should set up a United Nations trade commission.

Earlier, attention was called to two red lights which must be heeded in planning postwar commercial policy. We must take account of the demand for full employment and the demand, in countries now specializing in extractive industries, for industrialization. In the multilateral agreement exceptions must be allowed for both these needs, not in a vague general way, but by the establishment of criteria. The application of these criteria to specific cases would be a duty of the trade commission.

In addition to its administrative duties, the commission should act as a research and advisory body, whose services would be available to all the countries which had joined in its establishment. The commission should, of course, act in close co-operation with such other international economic agencies as may be established in the fields of transportation, investment, and price stabilization. Its relations with the international currency stabilization fund would be particularly important.

The critical question naturally arises at this point: "How can Russia effectively participate in such an agreement?" The Soviet Union would, of course, be glad to see other nations remove their quotas and prohibitions and reduce their import duties. She would appreciate equality of treatment. But she could assume all the obligations of the multilateral agreement as respects tariffs and still maintain a rigid system of protection simply by limiting her purchases of foreign goods, or by reselling them to domestic consumers at high prices. Likewise, although the Soviet government gave all countries equal treatment in import duties, the Russian trade monopoly in its purchases of foreign goods might exercise the grossest discriminations. Obviously, therefore, some special provision should be made in the agreement regulating the trade between planned economies such as the Soviet Union, on the one hand, or states in which foreign trade is a government monopoly, and the free-enterprise economies, on the other. The two objectives of such a provision would be: (1) to guarantee that the Russians should not employ their trade monopoly as a means of granting excessive protection to domestic industries and (2) to make sure that they would not use it as a means of trade discrimination. These objectives might be attained if Russia would first agree to buy a certain global value of foreign goods each year, say, two billion dollars a year to start with. Russia should further agree that in making its purchases her trade monopoly should buy in the markets where prices were lowest and refrain from discrimination. Naturally, the global amount of imports would need to be adjusted from time to time, perhaps annually, to take account of changes in production and in markets. It might prove possible in an annual trade conference for the principal trading nations to agree with Russia on the distribution among them of her minimum purchases.

AN OBJECTION TO A MULTILATERAL AGREEMENT

It may be objected that the attempt to deal with all phases of commercial policy at once is overambitious, that a series of agreements each dealing with a single subject would get better results. The easier problems might be taken up first, such as customs formalities, and, later on, the really tough matters—quotas and import duties. But that procedure, involving a series of international conferences, would waste precious time. Also, after all the conferences had been held the result might add up to zero; for the truth is that commercial policy, like international trade, is indivisible. You cannot reform it piecemeal, because every part is so closely related to every other part. For example, one country might be unwilling to remove its quotas until it knew what action others would take in limiting their import duties.

A second objection which will be argued with considerable force in this country is that multilateral negotiations are too complex; it would be impossible to get forty or fifty nations to agree on anything; it would be much more preferable, according to this line of argument, to conduct the negotiations by pairs of countries, after the fashion of the Hull trade agreements. In answer to this argument, it should be pointed out, first, that in the preliminary negotiations leading to the proposed multilateral agreement, following the precedent already established at Bretton Woods and Dumbarton Oaks, only three or four countries would participate. They would, of course, have already consulted other members of the United Nations group, all of whom later would be invited to adhere to the agreement. Second, the American method of bilateral tariff bargaining seems to me of only limited usefulness in the critical years that lie ahead. I do not mean to underestimate the past accomplishments of the American trade agreements. Largely as the result of Mr. Hull's loyal support, they did put an end to the upward movement of American tariffs. But the thirty agreements added together did not accomplish a major reform in the American tariff system or in that of the countries with which we bargained. The process of negotiating bilateral agreements has proved slow and cumbersome; we shall need to move much more quickly if we are to forestall the resurgence of economic nationalism. A still more important objection is the basic defect inherent in bilateral action. No country can be expected to initiate a major change in its tariff policy in negotiations with a single country. In the first place, it could not expect from any single country what would seem adequate compensation for such a change. Second, each of the bargaining countries, if they are to undertake a comprehensive revision of tariff schedules, must have their gaze constantly fixed on the policies of twenty or thirty other countries. Assuming that they intend to generalize all the concessions made to each other, they must calculate the effect of their bargaining on the whole complex pattern of their trade with the world. Because of these wide possible repercussions, bilateral agreements must be either exclusive in their operation or else very limited in their scope. But what we need after this war is action on a wide front, action initiated by the great trading nations, involving all important phases of commercial policy. For this purpose only a multilateral agreement will suffice.

WHAT WILL THE UNITED STATES DO ABOUT IT?

It appears from the foregoing discussion that only a general multilateral agreement for opening world markets can satisfy the English need for expanding exports. Without such a possibility the United Kingdom will inevitably be driven to bilateralism and to attempts to strengthen its system of imperial preferences. Through a multilateral agreement Russia will find the possibility of expanding its participation in international trade without endangering its good relations with free-enterprise countries. Lacking a multilateral agreement, we may expect that Russian trade will be a bone of contention, the object of active and perhaps disastrous competition on the part of free-enterprise countries. This might well prove the rock on which Anglo-American co-operation would shatter itself.

What about the United States? How will its interests be served by an agreement of the kind just sketched? First, observe that the agreement would enact as international legislation practically all the principles of American commercial policy. No country has stood more consistently than our own for the cardinal principal that every country is entitled to equal treatment in tariff policy. No country has protested more vigorously against the throttling of international trade through prohibitions, quotas, and licensing systems. We have taken our stand, time and again, against the indirect discriminations resulting from bilateral clearing arrangements. It is true that, while objecting to the kinds of protectionism practiced by other countries, we have steadily maintained our own variety. We have practically excluded foreign-manufactured goods from our markets by high import duties backed by an elaborate system of customs administration, rigidly enforced. But since the high-water mark of American protectionism was reached in 1930, this country has been gradually moving toward more moderate tariff policy. There are now indications that many of our business and labor groups, irrespective of political affiliation, recognize the advantages which this country would gain from encouraging larger imports of foreign goods. Even the man in the street has begun to learn something about balances of payments; he can see the inconsistency of a creditor nation refusing to admit the goods which are practically the sole means whereby debtors can liquidate their obligations.

On the other hand, we may expect that strong objection to any cutting of tariff rates will be raised by protected interests. Some will want foreign competition kept out in order to protect monopoly positions. If we are really committed to maintaining free enterprise in this country, we can afford to disregard their clamor. But there will be many other cases in which, under the protection of high import duties, domestic manufacturers are actually operating at costs much higher than those of their foreign competitors. In these cases our federal government has an obligation, not to maintain this inefficient production forever, but to assist in retraining labor and in transferring capital to lines of production more suited to American conditions.

The widespread popular approval of American participation in a world security organization such as that discussed at Dumbarton

Oaks indicates that in the field of political co-operation the American people may be willing to assume real responsibilities. Whether or not they will accept corresponding responsibilities in the fields of economic co-operation, monetary stabilization, and trade control is still an open question. Undoubtedly, in all these fields there is a great task of popular education still to be accomplished. In such education it seems to me only a few fundamentals need to be stressed. No enduring peace can be built simply upon security arrangements, for the joint use of force to suppress potential aggressors. Such agreements are necessary, but they are not in themselves adequate. They need to be supplemented by other agreements designed to make the conditions of life more tolerable for the masses of men all over the world and to inspire them with the hope of future progress. For such a purpose no agreement can be better designed than one which will expand the volume of international trade.

THE FUTURE OF COMMODITY AGREEMENTS

By Edward S. Mason[1]

INTERNATIONAL commodity agreements are a species of trade agreement in which the participating governments undertake to regulate the production or marketing of a commodity or group of commodities. The regulation attempted may cover a wide range of possibilities from agreements to refrain from certain wasteful practices, as in various fishing treaties, to agreements limiting output and exports and fixing prices, as exemplified by commodity arrangements in rubber and tin. The decade of the thirties witnessed a rapid growth in the number and effectiveness of commodity agreements designed to cope with world-wide surpluses of agricultural and other raw materials. During the war, on the other hand, the United Nations (and their enemies) have entered into commodity agreements designed primarily to expand output and to allocate the available supplies of scarce materials. During the latter period "claimant" governments and agencies fought—within the limits of commodity arrangements—for a larger share of an inadequate output; during the former period claimant governments sought a larger share for their producers in an inadequate market.

It is not likely in the postwar period that commodity agreements will have to be consummated to accomplish an expansion of output. Raw-material production, in ordinary times, has a way of responding to satisfactory prices—or even to prices which are not satisfactory—which makes intergovernmental agreements to bring about expansion unnecessary.[2] It is, of course, obvious that, within a commodity-control scheme, adjustment can be upward as well as downward. But it will usually be found that even the upward adjustments leave supply less than it would have been if ordinary competitive forces instead of the commodity agreement had done the regulating. In a few cases—perhaps the international fishing treaties are the sole examples—commodity agreements have, by curtailing wasteful cropping practices, achieved a continued yield from resources which would otherwise have been exhausted. The principle of conservation through commodity agreements is capable of considerable extension, particularly in the field of forestry and mining. Experience warns, however, that conservation practices are too often merely the gilding on a device whose primary, if utilitarian, function is a curtailment of output. It would be too much to say that, with a few exceptions, international commodity agreements must be essentially restrictive in character. All that can be said is that in the past they have been so and that with respect to the future, so far as one can see, the expansion of output of a particular commodity will not ordinarily require international governmental agreements for its consummation.

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[2] It goes without saying that international agreements to improve nutritional standards, to expand the consumption of low-income groups by two-price plans or other methods, or to maintain industrial output and employment will be likely to increase raw-material production. These arrangements, however, and others foreshadowed by the proposed Food and Agriculture Organization lie outside the field of international commodity agreements.

THE CASE FOR COMMODITY AGREEMENTS

Commodity agreements represent an intergovernmental determination of output and prices of materials as against a determination by world markets. The case for such agreements rests principally on the following points: (1) Certain products, mainly agricultural, are produced in chronic surplus. By reason of a low mobility of resources, output adjusts only very slowly to price changes, and it ordinarily lies outside the capabilities of any one government to apply remedial measures. If a continuing world surplus is to be avoided, joint action by a number of interested governments is required. (2) Agricultural raw materials customarily exhibit an extreme degree of price instability, and the principal minerals and metals exhibit a high degree of output instability with attendant price instability if international controls are absent. Consequent fluctuations in producers' incomes exert an unstable influence in national and international markets, which might in part be eliminated by appropriate international commodity controls. (3) In the absence of international action, governments faced with chronic surpluses or fluctuating exports will undertake, unilaterally, measures which in their total effect will restrict the flow of international trade more seriously than will properly drafted commodity agreements. Countries dependent on the exports of one, or a few, products are affected most seriously by instability in the world markets for the products in question and are consequently most easily driven to drastic action disruptive of the flow of international trade. In other words, the case for commodity agreements is that situations arise in which governments are inevitably driven to measures to protect their producers and their exchange position and international commodity agreements are one of the least undesirable measures available.

It must be admitted that, under certain circumstances, the case is a strong one. Given a return to anything like the conditions of the thirties, a well-planned system of international commodity agreements might well be the alternative to a considerable degree of autarchism or of economic warfare. Certainly, anything like a return to a liberal commercial policy would be pretty much out of the question. It is to be hoped, however, that future prospects will not be quite so black. In any case, before embarking on a program of commodity agreements, it would seem advisable to take account of the following considerations: (1) the extent to which commodity agreements are inevitably subject to producer influence or control; (2) the relation between a commodity-agreements program and other aspects of postwar commercial policy; (3) the probable effect of a system of commodity agreements on an international program of industrial development and expansion; and (4) American interests in the export and import of materials subject to commodity agreements.

PRODUCER INTERESTS IN COMMODITY AGREEMENTS

Commodity agreements are frequently contrasted with cartels on the ground that, whereas cartel policy is motivated by an exclusive producer interest, commodity agreements, properly organized, can and will represent the broader interests of governments and consumers in the production and marketing of a commodity. A great deal of thought, both inside and outside of government, has been and is being given to the proper framework of commodity agreements and to the international machinery under which it is conceived that such agreements should function. The structure and policy of commodity organizations have, moreover, been shaped by the experience of the thirties, and it is unlikely that, in the postwar period, all the mistakes of an earlier era will be repeated.

The most important antecedents of intergovernmental agreements have been (1) private cartel arrangements, which, without government support, tend to break down, and (2) national valorization or price-supporting schemes. Existing agreements respecting rubber, tin, tea, and a number of other products first saw the light of day as purely private cartel arrangements. As private arrangements, however lacking the support of governmental authority, they were too weak to accomplish effectively that restriction of exports and production which was their primary purpose.[3] Ordinary business chicanery and the growing competition of producers outside the cartels placed their success in jeopardy, and governments intervened mainly to prevent a breakdown of private controls. It should be noted that government intervention was not undertaken because of the clamor of exploited consumer interests but at the solicitation of important producers. In these cases and in others the question naturally arises as to whether international agreements are any the less cartel agreements for having been negotiated by governments rather than by private interests. This question involves delicate issues concerning the relation of government to business enterprise which are likely to be met with in all international control schemes for commodities in which the principal producers are a relatively small number of large concerns.

A number of actual or projected commodity agreements have developed out of national schemes to support or raise the prices of given commodities. If an international cotton agreement comes into being, it will be largely through the efforts of the American government to combine price support for domestically consumed cotton with maintenance of a place for American cotton in the world market. The present and previous coffee agreements followed attempts by Brazil, extending over several decades, to manage, single-handed, its recurrent coffee surplus. In each of these cases the country principally interested in price support has seen its share in the world market decline in favor of uncontrolled areas. A leading authority on commodity agreements has summarized the experience with multilateral agreements as follows:

"Several existing and proposed agreements represent attempts to buttress costly and vulnerable national commodity 'controls.' All represent a special manifestation of the traditional tendency to protect existing investments or coddle producers, in this case by international sponsorship of price-supporting restraints of trade such as monopolistic business frequently resorts to."[4]

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[3] In general, the fewer the producers, the more likely it is that they will be able to come to a mutually satisfactory arrangement without the intervention of government. This is particularly true if the market position of these producers is strengthened by patent controls, the pooling of which may provide the essential basis of the agreement. Industries with a larger number of producers may be forced to enlist the support of governments to accomplish what others, with a high degree of concentration, can accomplish privately.

Although the traditional producer orientation of commodity agreements is clear and although the exponents of liberal commercial policy continue to view such arrangements with alarm, they came to achieve, during the 1930's, a considerable measure of respectability. The World Monetary and Economic Conference of 1933, meeting in the midst of world depression, took a definitely friendly attitude. Since that time a number of international organizations and conferences have recorded their approval of these agreements as an effective medium of economic planning. Most of these bodies, however, have stressed the necessity of a limitation of producer control and, among other checks, have favored consumer representation in the negotiation and administration of international agreements.

PROTECTING CONSUMER INTEREST

Responding to the times, the tin and rubber agreements provided for such representation, and agreements affecting beef and coffee, among others, have made similar provision. The effectiveness of such representation has, as one would expect, varied considerably with different commodity situations. In the case of rubber there is some evidence that consumer representation has not been without effect. The representatives in question were British, German, and American rubber manufacturers, by far the largest processing consumers. Such influence as these representatives were able to exercise, however, appears to have consisted in calling attention to the availability of limited alternative sources of supply. Important tire manufacturers were themselves the owners of rubber plantations in the East Indies, Liberia, and elsewhere. The industry, furthermore, was accustomed to carrying several months' supply of crude rubber as inventory, and the ordinary yield of reprocessed rubber was always capable of considerable expansion. Consequently, rubber manufacturers were able to point out that the monopoly of the participants to the agreement was not complete and this, added to previous unfortunate experiences with unjustifiable price increases, tended to produce what may be described as a rational monopoly policy determined with due regard to the demand situation.

In the case of tea, although no formal provision for consumer representation is contained in the agreement, the fact that the principal producing empire is also the principal consumer automatically introduces a consumer safeguard.[5] Here there exists little possibility, as there is in most commodity agreements, for transferring the cost of a price-supporting scheme to other countries. Coffee represents another very special case. Here the overwhelmingly important consuming country, the United States, was adequately represented in negotiations leading to the Inter-American Coffee Agreement of 1940. Indeed, it may be said that the success of the agreement is dependent upon the participation of the United States, which, through its control of coffee imports, is able to enforce the quota features of the agreement in a manner quite beyond the capabilities of the other participants. What the United States represents in the Coffee Agreement, however, is not the interests of domestic coffee consumers but the political value of hemisphere solidarity in time of war. As a recent student of coffee has put it, "In the interests of hemispheric solidarity the United States has displayed extraordinary generosity toward its Latin American neighbors."[6] This is, however, not precisely what is ordinarily meant by consumer representation.

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[4] J. S. Davis, "International Commodity Agreements," in S. E. Harris (ed.), *Post-war Economic Problems* (1943), p. 317.

The International Beef Agreement was likewise negotiated with the help of a principal consumer, in this case the United Kingdom. The British interest in beef was to protect domestic producers and assure empire producers of an export market without unduly raising the price to consumers. Rather than impose a tariff, which would have affected consumers adversely, Britain entered into an arrangement which assigned quotas in the British market to the principal exporting countries, meanwhile subsidizing her domestic production.[7]

On surveying these and other examples, one cannot help concluding that the representation of consumer countries is not the same thing as the representation of consumer interests and that in those cases in which the interests of the ultimate consumer have been protected it has been because of some unusual circumstance not ordinarily relevant to multilateral commodity agreements. These agreements have, since the early thirties, shown a trend toward more effective controls and toward more moderate price policies. The primary reason for the latter, however, is, without much doubt, an increasing awareness by producer interests of the long-run limitations to their monopoly position. It may, perhaps, be said that consumer representation tends to accelerate the process by which producers become aware of these limitations; beyond this it is difficult to see much effect.

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[5] Cf. V. D. Wickizer, *Tea under International Regulation* (1944), p. 110. Since so large a part of consumption is in the British Empire, it is politically difficult to raise prices.

[6] V. D. Wickizer, *The World Coffee Economy* (1943), p. 203.

[7] Cf. J. D. Black and Stanley S. Tsou, "International Commodity Arrangements," *Quarterly Journal of Economics*, August, 1944, p. 528.

THE NATURE OF CONSUMER INTEREST

In the commodity agreements to be consummated in the postwar period, consumers may be said to have an interest (*a*) in preventing prices from being set at levels higher than necessary to yield continuously adequate supplies of the commodities in question and (*b*) in limiting the restrictive practices of the agreement to the shortest period necessary to overcome the surplus situation, whether by a transfer of resources out of the industry, by expanding consumption, or in some other way. These interests can be protected, on occasion, by threat of consumer-country retaliation against producer countries' participation in unreasonably restrictive international controls. They may also be protected by international agreements governing the practice of commodity controls by countries adhering to the agreement. It is along the latter line that current work is proceeding.

A recent study by the International Labour Office proposes the creation of a world commodity organization forming a part of a broader international economic body. After noting that one-commodity planning inevitably tends toward restrictive measures, the I.L.O. study maintains that "the broad effect of the introduction of such a general commodity control organization would be to make the schemes for particular commodities tools for the execution of a comprehensive policy formed as a part of a general programme of international economic and social development."[8]

Likewise the Interim Commission of the Food and Agriculture Organization, following the instructions of the Hot Springs conference, "recommends to its constituent governments that international commodity arrangements for both agricultural and non-agricultural products be coordinated under the supervision and direction of a single international authority."[9]

Both the I.L.O. and the Interim Commission emphasize the importance of an international acceptance of principles governing the administration of commodity controls; both insist that such controls be subordinate to broader international plans for development and expansion of output. If these recommendations were to be consistently followed, proposals for international commodity agreements restricting output or exports and fixing prices would be received by the International Commodity Organization in the same manner that a conservative banker greets a dubious loan application, and would be scrutinized with great care. The primary consideration would be the avoidance of an adverse effect by the proposed controls on the general program of development and expansion. Restrictive measures would be permitted only as a temporary expedient necessary to the management of an undesirable surplus situation pending the undertaking of positive action designed to remove the possibilities of a continued waste of resources.

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[8] International Labour Organization, *Intergovernmental Commodity Control Agreements* (1943), pp. xxxvii.

[9] *Second Report of Interim Commission*, p. 24.

If such procedures were followed, one might reasonably expect that restrictive commodity agreements would be held to a minimum and that, in those agreements found necessary, consumer interests would be adequately protected with or without consumer representation. It is not completely out of the question that such an objective might be realized by international agreement. On the other hand, it is quite clear that strong interests are pressing for an altogether different type of international commodity organization, an organization which would regard its functions as essentially promotional in character and which would measure its progress by the number of commodity arrangements it was able to negotiate and their effectiveness in serving producer interests.

In sum, the principal antecedents of commodity agreements have been international business cartels and national schemes of commodity price support; although the development of the 1930's was in the direction of more effective organization and more moderate policies, the latter trend was rather the result of a realization of marketing limitations than of the emergence of consumer representation in these control schemes. Current opinion favors the subsuming of specific agreements under the authority of an international commodity organization; but it remains an open question whether, under such circumstances, commodity controls would become subordinate to a broad program of development and expansion or whether they would become an increasingly favored international instrumentality for advancing essentially producer interests.

COMMODITY AGREEMENTS AND COMMERCIAL POLICY

It is maintained in some quarters that only two possible courses of action are open to governments in the field of postwar commercial policy. Either the existing world market for commodities will be divided, in peaceful fashion, by international agreements, public or private, or a state of economic warfare will ensue with producers engaging in cutthroat competition for available markets, assisted by export bounties and other subsidies, and with governments protecting their domestic markets with every known type of restrictive device. The alternatives are frequently stated as international economic planning or international economic anarchy.

If the postwar world witnesses a return to the economic conditions of the 1930's, it may be freely admitted that this is a fair statement of the probable alternatives. Under such circumstances it can be effectively argued that a division of inadequate world markets by international agreement is an alternative preferable to the kinds of unilateral action which would be all but inevitable. If, on the other hand, a considerable expansion of world trade is possible, a third course of foreign economic policy becomes not only feasible but highly desirable.

The chief impulse to an expanding volume of world trade can and must come from the United States; the chief obstacles are likely to arise out of the exchange shortages of the principal European countries. The economic weight of the United States in the postwar world will be tremendous. It is not too much to say that a considerable part of the world will become prosperous or remain depressed as the United States maintains output or allows output to fall. By far the most important foreign economic policy which the United States could pursue is a domestic policy facilitating full employment. With a postwar national income of $130 billion, the volume of imports into the United States would be in the neighborhood of from $6 to $7 billion with an equal amount of dollar exchange thus made available to foreign purchasers. If this is augmented by a sizable program of American foreign investment, the basis is laid for an expanding volume of world trade. Under these circumstances—and only then—is the United States entitled to insist that other countries moderate or abandon the system of preferences, quantitive restrictions, tariff barriers, and exchange controls built up in the pre-war period.

Outside of China, India, and certain Latin-American countries, which have accumulated fairly large quantities of dollar exchange during the war, the shortage of foreign purchasing power in the post-war period will be acute. England will have lost three-quarters of her revenue from foreign investment and half her shipping revenue. She will have accumulated a large balance of indebtedness to her colonies and dominions and will, consequently, have to increase her exports from 50 to 100 per cent, in order to continue to import the same volume of goods as in the immediate pre-war years. This will be manifestly impossible unless the countries to which England normally exports have or can get purchasing power for a marked increase in their purchases. This again depends primarily on the situation in the United States. If such purchasing power is not available, England and other countries experiencing an exchange shortage will be forced to curtail imports in drastic manner. The shortage of exchange will appear as an excuse—and a legitimate excuse—for all sorts of controls and restrictions disruptive of the course of world trade.

AMERICAN TRADE INTEREST

Such controls and restrictions are manifestly not in the American interest. Our interest, as never before, is in a liberalizing of commercial policy both for economic and for political reasons. As an industrial country with a rapidly growing output potential, we are becoming a continually larger importer of raw materials and will be adversely affected by restrictive raw-material controls. The maintenance of a high level of domestic employment is significantly dependent on our finding export markets for an increasing volume of industrial products. Finally, and most important, we have a strong political interest in preventing a development of world trade in the direction of economic blocs and spheres of influence.[10] A liberal commercial policy is the most effective economic preventive of such a development.

Assuming that sensible policies regarding domestic employment and foreign investment have set the stage for a revival of world trade, the principal objective of our postwar commercial policy must be a progressive reduction of trade barriers. Within the framework of this commercial policy, however, international commodity agreements have a place. Even after a transition period, in which disposal of war surpluses will call for international commodity action, intergovernmental controls will be necessary to meet a set of special situations. The export of strategic materials to potential aggressors may have to be limited; agreements regulating overcropping or wasteful methods of extracting irreplaceable natural resources will inevitably increase in number and importance; unmanageable agricultural surpluses will exist in certain areas even on an optimistic forecast of world trade; in many commodity agreements, involving effective output controls, buffer-stock programs for evening out price fluctuations may be practical.

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[10] See "The Business Situation," *Survey of Current Business*, August, 1944, p. 5: "As a creditor country the United States has a heavy stake in a stable and high volume of international transactions. As a country committed to a free-enterprise economy, it is vitally concerned with the abolition of burdensome exchange controls and with the restoration of a multilateral system of international payments. As a country in which many industries have been expanded beyond post-war domestic requirements, it has a special interest in additional foreign outlets for its products as a means of easing the problems of reconversion as well as meeting the longer-run problem of the use of these domestic resources."

However—and this is the central point—the use of international commodity controls should be subordinated to the requirements of a commercial policy oriented in the direction of an expansion of world trade and a reduction of trade barriers. Such a policy is not going to be able to accomplish the elimination of all quantitative import restrictions, of all exchange rationing, or of all protective or preferential import duties. No more will it—nor should it—accomplish the elimination of commodity controls. What it should accomplish, however, is a recognition of commodity controls as an exceptional device whose use is strictly limited to exceptional situations.

Consuming countries may well accept a wisely administered commodity agreement even though it increases the import price of a product if it is clear that a really serious surplus exists and if positive steps are taken to remove the causes of the existing situation. A promotional attitude toward agreements, however, on the part of countries with an export interest in the commodities in question will inevitably lead to a proliferation of commodity controls in which these countries will find that their import interests are also affected. Furthermore, an unwise imposition of such controls will meet with other forms of retaliation in the form of tariffs, import restrictions, and the like, out of which the existing network of trade barriers is shaped.

The prerequisite to a liberal commercial policy, within which commodity controls should play a limited role, is the possibility of a considerable postwar expansion of world trade. Although the prospects for such an expansion must—if the United States does its part—be considered good, will the world not still be faced with surplus problems of considerable magnitude demanding international commodity action? Furthermore, is not the demonstrated instability of raw-material prices in itself a justification for effective commodity control?

THE OUTLOOK FOR RAW MATERIALS

It is probable that in the immediate postwar period the world will be faced with certain surplus problems of exceptional difficulty. The more serious of these problems will be outside the agricultural field. While stocks of wool and wheat are unusually large, the disposal of a substantial part of excess supplies through relief channels in Europe should not be too difficult. With respect to a number of metals, however, large current stocks will be augmented for a number of years by extraordinarily high yields of scrap. On the other hand, it is possible that strategic stockpiles in this and other countries may absorb the principal part of such surplus supplies. A number of types of equipment will exist at the end of the war in such large quantities that no practicable marketing program is feasible. It is impossible at the present time to estimate the size of the postwar surplus-disposal problem, but it must be recognized that international agreement may well be useful in handling certain aspects of this problem. Such agreements will be the easier to consummate since governments will hold a sizable fraction of surplus stocks. It would be unfortunate, however, if international arrangements undertaken to dispose of war-induced surplus stocks were extended beyond the minimum period necessary for this purpose.

Over the longer run there is strong reason to believe that the prospect for most industrial raw materials and for foodstuffs is good. The enormous requirements of the American economy at full employment have been demonstrated during the war; and, although the coming of peace will change the pattern of these requirements, it will not, if employment is effectively maintained, substantially reduce the total volume. Certain of the raw-material-producing areas of the world, notably Latin America, India, and China, appear to be on the eve of a period of extensive industrialization. They will emerge from the war with large foreign-exchange holdings, and their borrowing for purposes of industrial development promises to be considerable. The direction of such international planning as has moved into the area of practical discussion, in particular the International Bank and the Food and Agriculture Organization, is pretty definitely toward expansion of industrial output and the raising of consumption levels. Finally, an opportunity exists in the European settlement of substantially reducing the unconscionably high agricultural tariff barriers and thus of shifting resources away from their uneconomical use in grain and sugar production.

The wartime expansion of American agricultural and industrial raw-material production, the development of synthetics, and the destruction of European and Japanese industrial facilities work in the opposite direction; but there is some reason for believing that the main effect of such factors will be temporary. Relying principally upon the steadily increasing industrial potential of the United States and the industrialization, facilitated by international capital movements, of raw-material-producing areas, the English economist, Colin Clark, foresees an improvement in the terms of trade of primary products, over the next fifteen to twenty years, of as much as 90 per cent, compared with the average level of 1925–34.[11] While Clark's views may well be unjustifiably optimistic, it is altogether probable that a substantial improvement of the raw-material terms of trade will occur if the United States lives up to its responsibilities.

The current case for extensive international commodity controls is built, in the author's view, upon a projection of world trading prospects unduly colored by the experience of the 1930's. The unmanageable surpluses and steadily worsening terms of trade characteristic of the "raw-materials revolution" in the interwar period and the monopolistic use made of their bargaining position by countries which remained heavy raw-material importers provided an exceptionally strong case for the extension of such controls. In a period of expansion, however, the imposition of raw-materials controls strongly oriented, as they will continue to be, in the direction of producer interests may endanger the maintenance of the forces working for expansion. It seems highly undesirable to impede postwar developmental possibilities by a system of international commodity agreements predicated on the assumption that the main problem of commercial policy continues to be the management of raw-material surpluses.

Regardless of the magnitude of the surplus problem in the postwar period, it will still be true that raw-materials producers are peculiarly susceptible to variations in the price of their products.[12] To a certain extent the range of variation in raw-material prices in the past has been due to the excesses and failures of attempted control schemes; but, even in the absence of such attempts and failures, weather variability, industrial fluctuations, the discovery of new supply sources, and other factors work in the direction of unusual instability in raw-material markets. This instability has involved two sets of problems leading to governmental action impinging on the field of international commodity agreements. One is the problem of maintaining, in the face of fluctuating demand, the income of producers; the other is the maintenance of a stable flow of foreign exchange from the exports of the unstable commodity.

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[11] Colin Clark, *Economics of 1960* (1942), p. 52. But cf. Charles Kindleberger, "International Monetary Stabilization," in Harris, *op. cit.*, p. 377.

THE INSTABILITY OF FARM INCOME AND EXCHANGE DIFFICULTIES

These problems are frequently interconnected, though not necessarily so. The instability of farm incomes in the United States does not create serious exchange difficulties. However, in many Latin-American countries and in the East Indies, where an overwhelmingly large part of total exports are of a single commodity or a small group of commodities, fluctuations in the price and exports of these commodities seriously affect not only the income of producers but the quantities of exchange available for the payment of imports and, through tax receipts, the revenues available to governments. In the United States it is principally because we attempt to maintain farm income by price supports which tend to curtail the exports of our surplus agricultural commodities that international commodity controls are suggested as desirable. If we supported farm income by subsidy, such controls would not be an issue.

In other countries, however, even if producer incomes could be maintained by local subsidy, which is frequently impossible, fluctuations in the volume and price of exports would still create serious exchange difficulties. A remedy frequently suggested is the creation of an international buffer-stock control, which would support prices by purchases in years of surplus output and moderate prices by sales during periods of output deficiency. Discussion of the pros and cons of such a scheme have by now made it clear that the effective administration of such controls requires as a prerequisite the existence of national controls of output and exports. In other words, a buffer-stock scheme might be successfully operated as an adjunct to an international commodity agreement but not independently of it. In the absence of effective output controls, an offer to buy on a large scale, even at a price below the market, would be likely to lead to an increased output and thus augment the surplus which the buffer-stock control was attempting to eliminate.

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[12] Here, however, a vital distinction needs to be made between industries in which the workers are, in the main, also the owners and industries in which the owners are usually large employers of labor. In the former, which are typically agricultural, variations in the price of the product affect the incomes of the large mass of producers directly and immediately. Furthermore, since such owner-workers ordinarily have relatively low incomes, any increase in income is likely to be reflected immediately in an increased demand for goods. In industries, however, in which the owners are not, in the main, workers, the interests of those who control output is in maximizing profits rather than in total-industry income. Price variations here are not immediately reflected in variations in worker incomes, and it is by no means certain that an increase in total-industry income (profits plus wages) will lead to an increase in the demand for goods.

Even as an integral part of an effective international control scheme, buffer-stock manipulation confronts formidable difficulties. Almost universal experience indicates that sales by the pool will meet strong and effective producer resistance. The timing of purchases and sales is likewise a most difficult operation. However, when international controls are necessary for other reasons, the incorporation of buffer-stock operations can, no doubt, serve a useful purpose. Whether, on the other hand, it would ever be desirable to institute a system of national output and export controls in order to even out fluctuations by buffer-stock operations is another question.

AMERICAN INTEREST IN INTERNATIONAL COMMODITY CONTROLS

The United States has a clear security interest in lessening the drain on the remaining Western Hemisphere—particularly on our own reserves of certain irreplaceable strategic materials—and a lesser interest in curtailing wasteful practices of exploitation. Oil, copper, bauxite, mercury, and perhaps a few other commodities belong in this category. The United States also has an interest in coordinating its policies of disposal of war-created surpluses with those of other countries. It has already been pointed out that the principal problems here concern facilities and equipment rather than raw materials. Outside these special areas, the dominant consideration affecting American interests in international commodity controls—which necessarily relate principally to the field of raw materials—is that the United States is, on balance, a heavy importer of these products.

As the accompanying tabulation indicates, this was true before the war, and our import balance is likely to be very much larger in the postwar period.

In the period covered by the statistics, the United States had an import balance for all years except 1938. The export balance of that year is accounted for by the fact that large raw-material inventories were accumulated in 1937.

If foreign-trade statistics are compared with national income data, a close correlation is evident between changes in the national income and the size of the raw-material import balance. The larger the national income, the greater the excess of imports of raw materials and unprocessed foodstuffs over exports. Between 1934 and 1937, when national income rose by slightly more than $20 billion, imports of raw materials and unprocessed foodstuffs increased by more than $600 million. For every billion dollars of added income, raw-materials and foodstuffs imports increased by $30 million. Although this comparison probably overstates, for various reasons, the true relationship, an increase of raw-material imports of $25 million for every billion-dollar increase in national income seems to be a fair estimate. Although a number of changes during the war period will alter this relationship, it seems probable that, with a postwar national income of from $130 to $140 billion, raw materials and unprocessed food-stuffs will show an import balance of the general order of $750 million.

UNITED STATES TRADE IN RAW MATERIALS
AND UNPROCESSED FOODSTUFFS
(In Millions of Dollars)

Year	Imports	Exports	Import Balance	Year	Imports	Exports	Import Balance
1934	715	712	3	1938	836	843	− 7
1935	904	742	162	1939	1,036	639	397
1936	1,082	726	356	1940	1,296	530	766
1937	1,384	827	557				

Under the circumstances, it would seem extremely unwise for the United States to promote a system of international controls which are bound to increase the value of our imports more than they increase the value of our exports.

The persistent agricultural surpluses which are alleged to make American participation in a system of international commodity controls necessary are pretty much limited to cotton and wheat. With respect to cotton, the proper objective of government policy would appear to be the maintenance of producer incomes pending a shift of resources out of cotton culture. The methods of maintaining producer income used to date have involved an extensive—not to say lavish—support of cotton prices. As a consequence of this policy we have seen a drastic curtailment of our foreign market, and it seems likely that our domestic market will also be endangered. Two of the largest cotton mills in the country have recently announced their decision, because of the continued and prospective high price of cotton, to switch to rayon in the postwar period.[13]

Our foreign market can be maintained under these circumstances only by a large program of export subsidies or by an international agreement allocating the world market as between the principal producing countries. The newer cotton-producing countries, however, such as Brazil, show no interest in the restriction of acreage and export which would be involved in the latter alternative. They are unlikely to accede to an international commodity agreement for cotton unless they are guaranteed a very considerable *quid pro quo*, which will be at our expense. There need be no argument about the desirability of maintaining the income of cotton producers in the United States. But the proper policy would seem to be a program of subsidization of cotton growers contingent upon a shift of cotton acreage to other uses. If the price of American cotton were allowed to fall to world-market levels, a process which, under such a program, would involve no diminution of producer incomes, both our foreign and our domestic markets could be maintained, and the necessary shift of resources out of cotton culture would probably be small.

The prospective world wheat surplus would be close to nonexistent if the extremely uneconomic European grain tariffs could be substantially reduced. In the coming European settlements a real opportunity will arise, in some cases through the use of compulsion and in others of persuasion, to accomplish this result. If this cannot be accomplished, a real case exists for international commodity controls, and, in this instance, the agreement of the principal countries concerned need not involve exorbitant concessions on our part.

In spite of this and, perhaps, of a few other exceptions, the long-run interest of the United States, as an increasingly important raw-material importer, is clearly to hold restrictive international commodity controls to a minimum.

[13] *New York Times*, August 13, 1944, Industry and Trade Review Section.

CONCLUSIONS

The disposal of war-induced surpluses will, in the period immediately following hostilities, constitute a problem of, as yet, undefined magnitude requiring international commodity co-operation. Whatever measures are necessary, however, should be limited in duration and in scope. Beyond the transition period there can be envisaged, even under favorable conditions of world trade, a number of situations in which the application of international commodity controls will be a more desirable course of action than probable alternatives. Agreements limiting exports to potential aggressors, regulating methods of harvesting or exploiting scarce resources, and providing for the orderly marketing of unavoidable surpluses will be called for. As an adjunct to such control schemes, the establishment of buffer stocks may go some distance toward reducing undesirable price fluctuations.

If the postwar world involves a return to the economic conditions of the 1930's, it must be recognized that the role of international commodity controls will be a large one. On the whole, however, the prospects for raw-material consumption, including foodstuffs, are favorable and will be more so if the United States lives up to its international economic responsibilities by maintaining domestic employment and by facilitating capital exports. Existing plans for international co-operation on finance and in food and agriculture envisage an expanding world economy. Under these circumstances, it would be a mistake to embark lightheartedly on an extensive program of international commodity controls, which, at best, are more effective at restriction than at expansion. At worst, such controls may seriously handicap attempts to bring about expansion of output and the development of world trade.

American interests run clearly and demonstrably in the direction of an extensive liberalizing of commercial policy. This is true on broad political and economic grounds relating to the avoidance of economic blocs and spheres of influence. It is likewise true on a narrower consideration of our export and import interests. Although international commodity agreements have a place in such a commercial policy framework, it should be definitely a subordinate place. The management of surplus and related commodity control problems must not be allowed to impede whatever measure of trade expansion is within the capability of the postwar world.

FOOD AS A FACET IN INTERNATIONAL TRADE

By LEROY D. STINEBOWER[1]

FOODSTUFFS have more than once occupied a prominent place in discussion at critical turning-points in the history of the commercial policies of nations. The repeal of the Corn Laws in England, Bismarck's famous "compact of iron and rye," and the Austro-Serbian "pig war," which played an important role in leading to real war in the Balkans, are only a few of the more striking instances out of many that could be cited. In this country the first step in the return to high protectionism following the last war was the Emergency Tariff Act of 1921, which dealt principally with agricultural products; and the tariff revision which became the Tariff Act of 1930 was initiated on behalf of, and was originally supposed to be confined to, the relief of agriculture.

But while *foodstuffs* and their producers have often been very much at the core of international trade policies, until recently there has been little public discussion of the relation of international trade to *food* and the people who have to eat it to live.

THE NATURE OF TRADE IN FOODSTUFFS

At the outset it will be useful to have in mind some rough quantitative characteristics of the place of foodstuffs in international trade. In the pre-war decade, 1929–38, foodstuffs accounted for roughly one-fourth of the value of all commodities moving in international trade, but with a tendency for the proportion to stand somewhat lower at the close of the period than at the beginning.[2] The year-to-year fluctuations in this proportion were considerably greater than in the case of manufactured articles and somewhat less than for raw materials.[3]

The international movement of commodities in this decade was, of course, greatly affected by the fluctuations in the level of economic activity throughout the world and by a marked growth in the number, variety, and severity of restrictions on international trade and international payments. In addition, the wide fluctuations in prices and in foreign exchange rates make necessary a certain reserve with respect to summary generalizations about changes in value and volume of trade over the period. But with these reservations it is approximately true that by 1938 the value of all world trade in terms of current dollars had recovered from its depression low points to about two-thirds its 1929 level, and its quantum (an approximation of volume) to a little less than 90 per cent. Foodstuffs, like raw materials, had experienced much wider price fluctuations than had manufactured products. The quantum of foodstuffs was relatively more stable from year to year than that of the other major categories of commodities; but, even so, it fell by 18 per cent and recovered only half of the loss and at the end of the period was still about one-twelfth below the 1929 volume.

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[1] Adviser, Office of Economic Affairs, U.S. Department of State.

[2] League of Nations, *Review of World Trade, 1938* (Geneva, 1938). As used in the League classification, "foodstuffs" include live animals, fodders and feedstuffs, all vegetable fatty oils, beverages, and tobacco.

[3] The ranges were: foodstuffs, from 29 (1932) to 23 per cent (1937); raw materials, 39.5 (1937) to 32.5 per cent (1931); manufactured articles, 40 (1930, 1931, 1938) to 37.5 per cent (1933, 1936, 1937) (*ibid.*).

There was during the thirties a substantial shift in the composition of international trade, with raw materials gaining in relative volume as compared to foodstuffs and with foodstuffs declining relatively in value in comparison with both raw materials and manufactured articles.

It will be useful to bear in mind also that international trade in foodstuffs is a comparatively concentrated trade. Roughly two-thirds of the total in 1938 was made up of three meats (beef, mutton, and pork), three cereals and flour (wheat, corn, and rice), butter, sugar, citrus fruits, vegetable fatty oils and oilseeds, coffee, tea, and tobacco. The mere enumeration of these commodities also serves to indicate the high degree of concentration of the exports of many of them in a few countries or areas.

But, while the major foodstuff exports are highly concentrated in a few countries, production is not. Not only is agriculture the world's leading industry, it is also the one most widely distributed. Each country can and does produce a large part of its own food supply and, except for some of the distinctive foodstuffs of the tropics, each country produces some part, usually substantial, of nearly every kind of food consumed. This would continue to be true in the absence of any trade restrictions. For most countries there tends naturally and without interference to be more self-sufficiency in food than in other broad categories of commodities. In part this flows from the fact that agriculture is an industry subject to conditions of increasing cost, in part because transportation costs over long distances would be prohibitive in relation to value, and in part because of the perishable nature of some of the foods. In part it is also because food production is often a by-product of other activities. For example, a dairy farm, a cotton plantation, or a coffee ranch usually produces a large part of its own food even though it may produce none for sale. Finally, food habits are more flexible and adaptable to locally available supplies than is true of most other items of consumption. In the United States the North eats white potatoes, the South, sweet potatoes; northern China eats millet and wheat, southern China, rice; Norwegians eat more fish than do Swedes; and Normandy drinks cider and apple brandy, while the rest of France drinks wine. The pattern of consumption in fuel, clothing, or even gadgets is far less variable in terms of local resources.

There is an important corollary of this. Because the factors of food production are so widely distributed and can be combined in such a variety of proportions, each country can, at a cost, greatly increase the production of almost all important foods or of substitutes therefor. Under such circumstances the gains from international trade do not always seem apparent. It is self-evident to anyone that if there are no tin or copper deposits within a country, the only way to acquire these materials is by trade. Until a country has a steel industry, it can have railroads only by buying rails. It is even simple to understand that Honduras cannot support an automobile industry or that grapes cannot be commercially produced in Scotland. But in meat and wheat, sugar and butter, a stimulated increase in production will appear to be an addition to the national income, whether actually so or not, rather than a cost. The cost becomes apparent in daily experience, if at all, only when the process is driven to extremes where the domestic price of the commodity begins to be several times what it could be imported for, or when the country's own export markets begin to dry up as a result of its restricted imports. Furthermore, once production has been increased by protection or by other price-supporting devices, it begins to be assumed that the entire output is dependent on such support for remunerative prices and that the alternative to these policies is not merely less production, but no production at all.

There are no satisfactory figures on which to base any estimates, but as a rough guess the $6 billion of foodstuffs and related products which entered international trade in 1938 would not appear to have exceeded, at most, 5 or 6 per cent of the total volume of foods and feeds consumed in that year, and may well have been much less. Even under much freer trade and with the most optimistic estimate of expanding and improved food consumption and levels of income in general, it would not appear likely that as much as 10 per cent of the world's food would become an object of international trade. The smallness of this percentage is not, however, a measure of the significance of such trade; for, small as it is, it is in large part a determinant of the standard of food consumption in many countries of the world. Within the framework of commercial policies affecting it, it determines whether the consumers of a given country must obtain their food from domestic sources, no matter how high the costs of production may be, or whether they may benefit by the lower-cost production of other countries. In the case of the bread grains, policies which drive the price to as much as three times world levels may not greatly reduce the consumption of bread; they may even increase it because it is still the cheapest food. But they do cause the consumer's food budget, which is inadequate in most of the world in any case, to be increasingly exhausted on these staples, leaving an even narrower margin or no margin at all for the more expensive protective foods. When the restrictive or other price-enhancing policies are applied to such items as butter, fruits, and meats, for which the demand is more elastic, the effect is a direct reduction in the consumption of these foods and a deterioration of the quality of diets as well as a reduction in international trade.

But the effects do not stop there, for these reductions in food imports induce an inability or unwillingness of the food-exporting countries to maintain their imports. The results are declining incomes for the consumers in both sets of countries and reduced levels of production and consumption in both.

Although stated abstractly, this is not based solely on theoretical analysis. It is in essence what happened to international trade in the interwar period.

THE INTERWAR EXPERIENCE

The first World War greatly disrupted and reduced European agriculture and even more greatly stimulated food production outside Europe, especially in North America, Argentina, and Australia. European agricultural recovery was not immediate, deficits in food supply continued, and the severe restrictions on trade which characterized the early postwar years were applied in general more against manufactured goods than against foodstuffs. Some export restrictions were even maintained on foodstuffs and raw materials. As a consequence, world trade in the principal foodstuffs remained higher than it had been in 1914. By 1925, however, European wheat production and the animal population were roughly back to the pre-war level. In the same year, Italy instituted its "battle of grain" with the objective of freeing the country, as far as possible, from imports of foodstuffs, and Germany celebrated the recovery of its right, under the peace treaties, to impose customs duties by promptly applying high tariffs on food items. French duties on food products were increased in 1926 and 1927. From then on, the rise in agricultural duties throughout most of Europe was steady, whereas duties on manufactures were on the whole being stabilized or even slightly reduced. England, Belgium, and the Netherlands alone remained significant exceptions to the trend. In the United States the first postwar tariff action was to raise duties on a considerable number of agricultural products in the Emergency Tariff Act of 1921. These rates were further increased in 1922 and 1930, and between these years the "flexible" tariff provision was used almost exclusively to increase duties on agricultural products. For the most part the American increases remained more or less ineffective, since, with a few important exceptions, this country was on an export basis in the major protected items.

Beginning in about 1925, therefore, the balance which had existed between European and non-European agriculture was impaired, and prices of foods in international markets began to decline. The decline was countered by higher duties, still further aggravating the position of the exporters. As the depression developed and world prices continued to fall, nearly every country attempted to protect its own agriculture from the impact and even to expand its own production. European tariff rates continued to rise, even to 300–400 per cent of world prices and were supplemented by even more effective devices, such as quotas, import licenses, mixing requirements, absolute prohibitions of imports, state monopolies, exchange controls, and exchange depreciation. Discrimination and trade diversion were superimposed on this restrictive picture through imperial and other preferences, differential tariff rates, multiple exchange rates, and clearing and payments agreements. Germany took advantage of the opportunity offered by agricultural depression to draw the countries of eastern and southern Europe into its economic orbit by paying high prices in their own currencies for their agricultural products, thus divorcing them from the world price level and rendering them almost wholly dependent on Germany as a market.

The food- and raw-material-exporting countries in turn increased restrictions on their imports, blocked payments for the goods they did import, depreciated their currencies, competitively subsidized their exports, adopted price- or income-supporting devices for their producers (in some cases with, in others without, restrictions on production), and entered into preferential or barter arrangements for limited outlets for their crops.

It would be wholly erroneous to infer that all these developments arose solely out of agricultural restrictions or that they were confined to agricultural products or that the depression was predominantly an agricultural phenomenon. But so significant were they in the field of agriculture and so extensively were their effects felt in industrial and agricultural countries alike that by 1932 the Senate had called on the Department of Agriculture in this country and in 1934 the League of Nations had called on its Economic Committee for reports on the world situation in agricultural protectionism.[4]

What recovery in trade did occur in the five years following 1933 was more in response to general economic recovery than to any general relaxation of restrictions; in fact, in many countries the restrictions increased. The sole major effort to reverse the trend was that embodied in the trade agreements concluded by this country. A large majority of the agreements of other countries, even when they did open up trade channels to some extent, were bilateral and discriminatory in character; and if in some instances they did stimulate trade along lines of greatest economic advantage, this result was largely fortuitous.

The principal conclusion that stands out in retrospect from this experience is that the measures taken with respect to agriculture and international trade in food products, Draconian as they were, did not even remotely achieve the results they sought. They did not bring agricultural prosperity and stability to the importing countries. Even less did they bring economic balance and stability in their economies as a whole. And some doubt may be felt today by the peoples of Europe themselves as to whether the achievement of a considerable measure of food self-sufficiency for strategic reasons was worth the cost.

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[4] *World Trade Barriers in Relation to American Agriculture* (Senate Doc. 70 [73d Cong., 1st sess.]) (Washington, 1933); League of Nations, Economic Committee, *Considerations on the Present Evolution of Agricultural Protectionism* (Geneva, 1935). The foregoing summary is drawn largely from these documents.

On the other hand, subsidies, two-price systems, import and production restrictions, and special measures to move surpluses through noncommercial channels did not bring equilibrium in the trade relations of the exporting countries, nor did they prevent the growing accumulation of stocks in those countries. In varying degrees in different countries, these measures did, however, achieve one of their objectives: they did improve the money incomes of farmers as a group.

What these measures did produce was an intensification of maladjustment in the world pattern of agricultural production, depressed world prices for food staples which were not allowed to be passed on to consumers, the discouragement of consumption, and an intensification of governmental intervention in the processes of production and trade. The shifting of production away from efficient producers toward high-cost producers was twofold. First, in the importing countries the extremes to which governments had to go in order to sustain increased agricultural production furnish measures of the higher costs and competitive disadvantage of the producers whom they were trying to protect. Furthermore, what imports were permitted were more and more brought within the framework of preferential arrangements, clearing agreements, and other trade-diverting devices, the general effect of which was to shift production away from the more efficient foreign sources of supply to other foreign sources which could not have competed except with the aid of these special arrangements. Second, in the "surplus" countries there was little tendency for production to concentrate in the hands of the lower-cost producers. Both political and social considerations dictated that governmental measures to support incomes of producers should be applied with a more or less impartial hand, supporting high-cost and low-cost producers alike; and, for the most part, when production was reduced, it was through a proportional reduction of the output of all.

The repercussions on consumption were also twofold. Protective measures, on the one hand, resulted in substantially increased prices, which, as might be expected, were accompanied by a marked deterioration in the quality of consumption. The other effect on consumption was a result of the general diminution of purchasing power arising out of conditions of depression and restricted foreign markets. In addition, the burden of the higher prices was necessarily borne to a disproportionate extent by the lower-income groups, whose consumption was already inadequate.

Another effect of these measures was the development of the concept that there was a "surplus" of the major foodstuffs, at just the time that there was developing an increasing awareness of the nutritional inadequacies of a large part of the world's population, even in the countries of relatively high average incomes. The concept of agricultural surpluses is an ambiguous one. In the physical sense of extraordinarily large stocks, such surpluses did not come into being until there was governmental intervention to support prices above the world level in the principal exporting countries. Despite the mass of restrictions that were developing, the world did currently absorb substantially all that was produced. But the contracting markets in which these foods could be disposed of and the low elasticities of demand for them meant that they found outlets only at disastrously low prices; and in this sense the concept of surplus production arose even before physical stocks began accumulating and was, of course, the principal reason for those forms of intervention which resulted in the accumulation of stocks.

In the United States we have since 1934, by one device or another, maintained the incomes of producers of our major food products, including those with respect to which we are on an export basis, at levels substantially above those which world prices would have yielded; and, except for the period when this was accomplished by means of the processing tax, we have done it by devices which maintain domestic prices, as well as producers' returns, well above world price levels. In spite of some success through trade agreements in regaining foreign markets for these products and in spite of substantial reductions in acreage devoted to some of them (but not necessarily in the amount produced) the higher American price has meant either that stocks have continued to accumulate or that they have been sold abroad at lower prices than they bring in this country.

FOOD IN POSTWAR TRANSITION

Now we are in another war, and again European agriculture is gravely disrupted and non-European agriculture has been greatly expanded. We may feel with a certain weariness that this is where we came in and that we have seen the show. Unfortunately, however, we cannot now walk out. What we can attempt to do is to learn something from the interwar period and endeavor not to see the same show again.

As compared with conditions at the end of the last war, the prospective situation at the close of this war promises to contain problems of even greater dimensions.

1. There will be the same general situation with respect to production: food deficits which may in a few years turn into "surpluses."

2. There will be a greater need than before for Europe to maintain for at least one crop year the maximum possible output of energy foods, which in the longer run it would be uneconomic for Europe to produce on so large a scale, with the resulting risk of perpetuation of such a production pattern. Both the Food Conference at Hot Springs and the Council of U.N.R.R.A. at Atlantic City have recognized that freedom from hunger must take priority over more desirable nutritional and agricultural goals and that, so long as a general shortage of food persists, every effort should be made to increase the production of foods for direct human consumption "even if this involves a departure from the use of the resources which in the long run will be required, and even if it delays a return to production policies which are desirable for technical, economic, or nutritional reasons."

3. In the interest of the greatest possible mobilization of resources for the prosecution of the war, there has been a greater degree of government intervention in the processes of trade, especially international trade, in this war than in the last, with the prospect that general or localized scarcities may make the retention of at least some of these controls necessary and desirable for a time. Shortages of supply and shortages of shipping have led to the almost complete displacement of private trade and have substituted centralized control for the more ordinary processes of the market place. Practically all international purchases are now conducted on a bulk basis by official public agencies, and a large part of these purchases are made under intergovernmental contracts governing the entire output of supplying countries. Through the Combined Food Board, the governments of the United States, the United Kingdom, and Canada virtually determine how the output not only of their own countries but of all other areas whose supplies are available to the United Nations shall be allocated between the armed forces and civilians and

how civilian supplies shall be allocated among the consuming countries. Furthermore, the same agency allocates a large part of the areas of supply, as fields for exclusive purchasing activity by either the United States or the United Kingdom and frequently helps decide the prices at which purchases shall be made. The procurement activities themselves are not carried on by the board but by agencies of one or the other governments.

These wartime economic controls, including direct participation on the part of government agencies in international trade, have been adopted solely as means of furthering the prosecution of the war and not as instruments of commercial policy. If they are not to become powerful instruments of commercial policy, it will be essential, however, that they be terminated as quickly as is compatible with the war effort or with the need for assuring equitable distribution of scarce supplies. There are already disturbing signs, however, that, unless there can be some assurance of reasonably adequate supplies for deficit countries and reasonable assurance of opportunity to market available supplies abroad, these wartime state-trading arrangements may be continued into the postwar period for other than purely emergency reasons. For example, the British Minister of Food on August 3 of this year announced in the House of Commons the conclusion of an agreement between the New Zealand and British governments for the sale to the United Kingdom of the total exportable surplus of New Zealand of butter, cheese, beef, veal, mutton, and lamb for the next four years, and of pork until June, 1946. The prices at which these sales will be made are fixed for the first two years but are subject to review in the third and fourth years.

4. As compared with 1918, we have in practically every country a background of higher pre-war protection for domestic agriculture as well as a background of national price- and income-supporting programs, generally involving subsidies and two-price systems. In addition, not only have the food-producing countries used price stimuli in their own countries to bring out a greater production of food, but the economies of other countries have been geared to the prices and contracts which the United States and the United Kingdom have made with them to stimulate and to assure their production. Even if the contracts are terminable at the end of the war or period of shortage, we cannot be indifferent to the effects of a sudden economic slump in those areas.

FOOD: ONE FACET OF GENERAL RECONSTRUCTION

International trade in food obviously does not exist as something apart from the rest of the economy. The problems of readjustment and reconstruction in this field are, therefore, only one way of looking at the problems of international trade and of agricultural and industrial readjustment in general.

It is not difficult to define what the major problems are. They include the need for relaxation of special wartime controls of production and trade as rapidly as is consistent with an orderly transition period; the need for measures to maintain employment and income at high levels and to mitigate extreme economic fluctuations; and the need to insure that, as production is readjusted, it will be along lines that correspond with the natural and economic advantages of each country or area. In some few cases they will require that the world as a whole shift production away from goods of which relatively too much has been produced to goods of which too little is being produced.

There is nothing new or novel in what this requires in the field of international economic policy. It requires international agreement on the widest possible base for the reduction of prohibitive tariffs. It requires agreement for the elimination or progressive relaxation of quotas, export restrictions, and exchange controls, particularly where these are used as instruments of trade control. It requires that such measures of protection for domestic industry and agriculture as are retained shall be administered on a nondiscriminatory basis. It requires that trade be again allowed to flow in response to conditions of economic advantage through the elimination of preferential systems and of bilateral trade arrangements. It requires that state monopolies shall not be used as instruments of trade diversion. It requires a recognition that export subsidies and two-price systems are as disruptive to international trade as are import restrictions. It requires that there be international co-operation for the maintenance of orderly exchange arrangements among countries, for the provision of short-term credits, and for the revival of international capital movements, and thus for the creation of conditions under which trade can begin to move more freely and payments can be made on a multilateral basis. It requires the development of resources and industries in less developed countries.

It is reasonably clear that there will be a disposition in few, if any, countries to wait for readjustments from wartime production to be brought about solely through the functioning of the price system. There is an increased insistence that high levels of employment and income can and must be sustained for peacetime needs as well as for the prosecution of war. There is evident also a general feeling that this goal will not be reached automatically but will require a considerable measure of public direction and assistance. The problem that this presents is whether these measures will be so conceived and administered as to reinforce each other and facilitate adjustment to a situation in which farms, mines, and factories can remain fully and efficiently employed or whether the measures will be haphazard improvisations, heavily loaded with restrictions on production and trade, which make no fundamental contribution toward such adjustment and hence require the continued maintenance of the underpinning.

That these measures can be conceived so as to reinforce each other is nowhere better illustrated than in the approach which has in recent years been made to the problems of nutrition. Beginning particularly with the work of the Mixed Committee of the League of Nations, there has been an increased awareness of the adverse impact of agricultural protectionism on the quantity and quality of the diets of large segments of the population in many countries.

There has also been increased awareness of the contribution which national food programs could make, on the production side, to agricultural adjustment. This contribution is as significant internationally as it is domestically. Larger production of such foods as milk, vegetables, fruit, and meats, coupled with the fact that many of these need to be produced in areas near urban centers of consumption, would afford greater opportunity for the areas best adapted for the production of energy foods. If, for example, the resources devoted to one-fourth of the average wheat production in recent years in Europe, excluding the Soviet Union, could be diverted to the production of protective foods and to feed grains, and if that amount were added to the trade of the major wheat-exporting countries, international trade in wheat and flour would exceed its level in any previous peacetime year. A 25 per cent reduction of output is, of course, a very substantial shift, but it would only carry European production back to roughly the 1926 level. As Denmark and the Netherlands demonstrated in the last quarter of the nineteenth century, such adjustments can be made and with profit to agricultural producers themselves.

In some respects the immediate future offers a unique opportunity. Tremendous readjustments in production are going to have to be made in all of the leading countries. In industry these readjustments are of even greater magnitude than they will be in agriculture. It may be hoped that, so far as national security is concerned, the nations will be disposed to seek a solution in international agreement for the maintenance of peace rather than in economic self-sufficiency behind trade barriers. There is also some reason to hope that many of the nations are rather thoroughly disillusioned as to the effectiveness of their trade-restrictive policies as means of promoting domestic prosperity. The tasks of reconstruction in war-devastated countries and the backlog of accumulated purchasing power in many other countries give a prospect of a high level of production and employment for at least a time in Europe, in the United States, and in other industrial countries. Reconversion and reconstruction could, if there were desire and will and co-operation among nations, be more easily directed into rational lines in the immediate postwar years than has been true for at least a quarter of a century or may be true again for a long time to come. Some of these considerations are, it is true, more directly applicable to manufacturing than to agriculture. But a sustained level of industrial income will also tend to facilitate adjustment in agriculture and may prove to be politically prerequisite in some countries to the abandonment of subsidies, domestic price supports, two-price systems, guaranteed export prices, and the other devices of governmental intervention which have developed in the United States and in many other countries and which are basically incompatible with international trade along lines of economic advantage and lines which will not generate international political friction.

At the same time, the immediate future will be a period with its own particular problems. Countries with difficult balance-of-payments positions arising out of the war and with great tasks of rehabilitation and reconstruction will be reluctant entirely to abandon controls over their foreign trade and foreign exchange. Countries which have greatly expanded their production, especially agricultural production, for war needs and for postwar relief will find it difficult rapidly to reduce that production and will feel impelled to maintain some floor under the incomes of their producers. There will be pressures to follow lines of least resistance and to minimize the immediate dimensions of reconversion and adjustment by keeping out imports, on the one hand, and subsidizing exports, on the other.

These problems and the fears to which they give rise are real. They indicate the need for transitional measures as well as for long-term policies. Agreements for the demobilization of trade restrictions will have a greater prospect of acceptance if in some cases they provide for reductions by stages and if they include, under appropriate safeguards, provisions for emergency action to prevent the worsening of a seriously adverse balance-of-payments situation. The International Monetary Fund and the International Bank for Reconstruction and Development, drafted by the experts at the Bretton Woods Conference, will, if agreed to by this and other countries, help to justify confidence that the pattern of trade can begin to rebuild itself on a multilateral basis without subjecting some countries to severe deflationary effects. With proper safeguards, commodity arrangements may be useful devices for orderly transition out of distress situations and not merely a means for the maintenance of prices and the perpetuation of unbalance. What is important is that such transition measures as are needed should be designed in connection with longer-run policies and so directed as to hasten the transition. Even so, they will need constant scrutiny, for the experience of countries which have embarked upon trade controls, trade diversion, commodity agreements, and other restrictive devices under the plea of emergency need bears eloquent witness to the fact that such devices tend to create their own justification for continuance. Emergencies may change their nature or their label, but they seldom pass.

Piecemeal approaches brought us close to economic chaos once before. If the various measures which are taken to speed the transition from an economy geared to war needs to a peacetime economy and to maintain stability in an expanding world economy are to fit together and reinforce each other, there will be needed a clear concept of the pattern of the goals sought and of the manner in which each measure is designed to contribute to that pattern. Otherwise we and other countries are likely to find ourselves resorting once again to makeshift devices to bolster up and alleviate particular conditions of distress, in what someone has called "a scurrying hither and thither in chase of the unapprehended consequences of ill-considered actions."[5]

[5] Quoted without citation in the (London) *Economist*, November 30, 1940, p. 661.

NEW HORIZONS FOR FOOD AND AGRICULTURE

By Paul H. Appleby[1]

THE discovery of the New World in 1492 was the most vivid extension of the physical horizon in all history up to that time. Three hundred years later, in 1799, the invention of the steam engine symbolized the extension of man's horizon in another and even profounder way. That achievement, ten years after George Washington became our first president, signalized the beginning of the great impact of science on modern civilization. It opened enormous areas of achievement and introduced into our culture changes of the most fundamental importance. The logic of events in ninety-three years brought us the automobile, and in another eleven years the airplane.

The physical horizon disclosed by Columbus thus was narrowed to very much less than its old dimensions, while there was opened another horizon, which stretches even farther than the unaided eye can see. This is the horizon opened by science. The universe it enfolds must be seen with new perspective. It must be considered in wholly new terms. The possibilities it reveals, no less than its problems, bear upon every way of life and every social institution.

In no field has the impact of science and technology been greater, in none are the possibilities of development more challenging, than in the field of man's most elementary concern, food—the field of man's first business, agriculture.

In the United States we have felt and profited from that impact as much as has any people in the world. Here less than a fourth of the people now have to concern themselves with food production, the others being free to produce other goods and services. What has been achieved here is only a beginning. What has been achieved here and in some of the other countries needs to be achieved, in a general way, the world around. And since the world has become recently and quickly in fact a community, we may believe that the path we have followed will be the path now quickly taken in other parts of the world. We know, too, that nothing could so much insure our own further progress and well-being; for we know now that not only are political and economic isolation impossible but that isolation in privilege is likewise impossible. We know that we must be citizens of the world and that we have an enormous concern in what kind of world it is.

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THE BASIC FACTS IN MIND AT HOT SPRINGS

In realization of these new necessities and new possibilities, there assembled at Hot Springs, Virginia, in May, 1943, the so-called "Food Conference." Delegates from forty-four nations participated in its deliberations. Besides the fact of interdependence in the modern world, the conference had constantly in mind these four basic facts:

This long after the industrial revolution, two-thirds of the people of the world still are engaged in producing food.

Two-thirds of the people of the world normally do not have enough to eat.

Knowledge of nutrition has so advanced that we know as never before the fundamental importance of adequate nutrition and what its requirements are.

Technology in production has so improved that we know how to produce enough food so that an adequate diet may be possible for everyone.

Some may question whether the objective of an adequately fed world is progressively possible of attainment. The question arises from the essay on population written in 1798 by Robert Malthus, famous English economist. In it he declared that population tends always to press against the available food supply. His statements were cautiously qualified, but in popular understanding they have been simplified into defeatist dogma. As fast as more food is produced, there will be more mouths to feed, according to popular interpretation of his thesis; since food supply was capable of only limited expansion and the population possibilities were unlimited, mankind is doomed to remain forever on the verge of starvation.

Such oversimplified statements overlook the power and complexity of mind and emotion. Today a smaller proportion of the world's energy is given to food production than ever before. That proportion can and will be steadily reduced. Paradoxically, that very reduction will be a necessary part of a program of improving the world's diet.

Today, even though the earth's population has greatly increased and even though two-thirds of mankind do not normally have enough to eat, the threat of starvation is a problem for less than half of the population. Our objective cannot be merely to free those millions from fear of starvation; it must be to make possible adequate nutrition for everybody.

A COMMON INTEREST

It is not merely science and technology that make this goal attainable. It is no less the determination of people in every land to make these things really fruitful for themselves and their fellow-men. There is no stronger force. There are no superior economic laws that deny the force of peoples' determination to organize in their mutual interest.

There still are areas in the world where the Malthusian interpretation would seem to have some application. In those areas progress will be especially difficult and slow. But there are vast areas in which it is largely disproved, and there is knowledge which disproves it further. The first essential is to change, in those restricted Malthusian areas, the expectations of men and to fire them with determination. For this reason the first thing the Food Conference did was to write something clear and large to do just that. It declared its conviction that "the world can and should and must be adequately fed—everyone, everywhere."

Adequate nutrition is indispensable if men are to be given a fair chance to realize their potentialities. Dr. Tom Spies, of Birmingham, Alabama, with his fine southern background as one of the world's distinguished figures in the field of nutrition, has come to the conclusion that there is no such thing as human "trash." Someday everybody will share that knowledge and that faith. Malnutrition is one of the basic factors in contributing to unsuccessful living. Only ignorance or hypocrisy assumes equality of opportunity among people when no more than a minority is decently nourished. We know now that if there were real equality of opportunity, the attainments of tens of millions of people would be on a very much higher level than they are at present.

But if the first essential in any such endeavor is to raise the expectations of men and to fire their determination, the second is to organize efforts designed to bring these higher expectations to fulfilment.

The objectives in this broad program have their national and their international aspects. By far the greater part of what needs doing must be done by individual nations within their own borders. But national policies that support and complement each other will greatly magnify the total result beyond what could be accomplished should each country chart its own course without knowing or considering what other nations were going to do. Working together is the best way to help each other. It is also the best way for a country to help itself.

INCREASED PRODUCTION AND BETTER DISTRIBUTION

At Hot Springs there was no thought in anyone's mind that what we were talking about had anything to do with relief. This was partly because all peoples are properly proud, desiring to win their own way on their own merits. Yet it was also partly because the delegates at Hot Springs were practical and informed men. We were talking about things in the production of which two-thirds of the people of the world earn their living, things everybody in the world has to have. No matter how large a place we might have been willing to give to charity and public assistance, we all clearly realized that if the program we devised was to be sound and enduring it simply could not be based on philanthropic benefaction.

How many have any accurate idea of how *relatively* small has been the American supply of food to the rest of the world even during the war and with Lend-Lease, when it has amounted to many millions of tons? Our shipments have constituted just 10 per cent of the food moving on the seven seas, and that, in turn, has constituted only a very small part of the world's whole food supply.

It should be clear, then, that if we are going to do anything about seeing that humanity is better fed, we are going to have to do it by increasing the production and distribution of food, much in the same way that most of mankind's food now is produced and distributed. We shall have to do it by improving production and consumption everywhere and by influencing public and private activity alike. What we visualized at Hot Springs did not carry the least hint that the United States or any other nation should or could feed the rest of the world or any part of it after the relief period, except as food becomes a normal part of international commerce. The problem of relief is altogether separate and has been separately arranged for. The United Nations Relief and Rehabilitation Administration has responsibility for that job.

What was envisaged at Hot Springs was wholly a postwar program, looking directly and exclusively to expanded economic and commercial activity in food. The conference asserted this in its covering "Declaration":

"It is useless to produce more food unless men and nations provide the markets to absorb it. There must be an expansion of the whole world economy to provide the purchasing power sufficient to maintain an adequate diet for all. With full employment in all countries, enlarged industrial production, the absence of exploitation, an increasing flow of trade within and between countries, an orderly management of domestic and international investment and currencies, and sustained internal and international economic equilibrium, the food which is produced can be made available to all people."

As has already been indicated, the objective of an adequately fed world is principally to be achieved by the action of individual nations. The delegates declared plainly: "The primary responsibility lies with each nation for seeing that its own people have the food needed for life and health; steps to this end are for national determination. But each nation can fully achieve its goal only if all work together."

WORK TOGETHER

The international aspect of the program is suggested by that last phrase, "work together." As the result of the deliberations at Hot Springs, an Interim Commission on Food and Agriculture was established by the forty-four nations to plan for a permanent working-together. This commission has recently published its report and recommendations. The report gives in thirty-four printed pages the personal interpretation of the members of their more specific recommendations. These latter, embodied in an eight-page Constitution, provide for a permanent international body to be known as the Food and Agriculture Organization of the United Nations—already being referred to as the F.A.O.

CONSTITUTIONAL PROVISIONS OF F.A.O.

The general organization provided for in the Constitution contemplates a governing conference comprising representatives of all the member-nations, with an executive committee of from nine to fifteen members, freely chosen by the conference. It includes a principal administrative officer, the director-general, aided by a technical, international staff working under his leadership. The charter provides for a process of amendment which insures that the powers of the organization with respect to any nation cannot be enlarged except with the consent of that nation. It leaves the question of permanent headquarters to be determined by the conference in the light of other postwar arrangements. It provides for working relationships with other international organizations. In general, it covers the basic matters met in drafting any constitution for a new association, taking into account the different interests of the various nations as they will work together under it. The Constitution authorizes the calling of conferences of all kinds of groups interested in food and agriculture—farmers, scientists, nutritionists, and handlers and processors of agricultural products. It authorizes similar activities in the fields of forestry, fisheries, and nonfood agricultural products. It authorizes the sending of missions to make special studies that may be desired by the various countries. It provides for periodic reports from member-governments showing progress made in productive efficiency and in raising standards of nutrition.

BUDGET

The budget for the first year is set at $2,500,000—of which the share of the United States would be $625,000. The report indicates that in subsequent years the budget will be about twice as much.

VOTE

By express provision in the Constitution, each member-nation will have one vote. All nations will be on an equal basis. The Great Powers do not even have assured places on the Executive Committee. Ordinarily, questions will be decided by simple majority vote. On more important matters a two-thirds vote is required.

The organization will have no power to impose any decision on any nation. Its functions will be to recommend, to stimulate, to give expert guidance, to bring nutritional and agricultural facts and policies effectively to the attention of the general public throughout the world, and to present these things in world terms.

EXCHANGE OF KNOWLEDGE

One of the very early functions of the F.A.O. will be to stimulate among member-countries the exchange of technical experts and students interested in becoming proficient in these fields. For a long time we shall need a steadily increasing number of persons technically equipped to aid in the improvement of agriculture and nutrition. Application of the idea of agricultural extension promises to be greatly expanded. Another somewhat similar function will be the bringing-together of farm leaders of all countries, so that they may become acquainted with each other and with each other's problems.

In a way the program could be described as stimulating in all countries the development of agricultural technology and services along the lines already familiar in this country. With wide variations in application under different conditions, what has been learned here and in other highly developed agricultural countries can be progressively made use of elsewhere. The possibilities are not everywhere the same, but everywhere farmers can produce more per acre, more per hour. Everywhere food production can be better designed to meet human needs. Everywhere food can be better stored, better utilized.

One very simple illustration may suggest the whole tremendous field. One of our Department of Agriculture scientists returned from a visit to Mexico two years ago saying, "If the average farmer there had just $1.50 worth of insecticide, he could produce three times as many beans." No one needs to give the Mexican farmer the insecticide. The need is, first, to show him what it will do and, second, to organize the necessary facilities; the increased bean crop will pay for the insecticide. More business in insecticides, in transportation, in beans—an expanding economy, higher standards of living.

Most of the people in this country live by working for somebody else or for corporations. Business and industry have become so highly complex that individuals have to associate themselves to cope effectively with that complexity. Present-day agriculture similarly is exceedingly complex. Only through special measures can our farmers capitalize on the opportunities inherent in current agricultural technology and modern methods of marketing.

With similar efforts in other fields directed also to an expanding world economy, we can look forward with much confidence to continuing progress toward the great objective of a world decently fed.

THE UNITED STATES' GAIN

The measures contemplated in this program can be fully as advantageous for the United States as for other countries. They promise new and larger markets for many of the things we are able to produce most efficiently. The road to technological improvement stretches on ahead here, too, as it does elsewhere. Moreover, millions in this country still need more food. Finally, a more prosperous world in which nations are co-operating to achieve prosperity will be a more stable and orderly world. We have an enormous stake in that.

If we want, we can view the effect of this widened interest in food in terms of the more immediate self-interest of agriculture. We all remember, of course, that when the orange producers joined hands to promote the sale of oranges they established for themselves both a much larger demand and a much wider market. In economic terms this simply took part of the total market away from producers of other goods. Consequently, if the need for adequate nutrition for everybody can be given the increased emphasis it deserves, other things remaining equal, food production generally will be on a better competitive basis compared with other industries than it is today. In that sense agriculture would see its immediate self-interest served. But the work of the F.A.O. will go much further than that. It will emphasize not only the importance of adequate nutrition but also the need for an expanding world economy and larger markets for producers of all useful goods.

Part of this total expansion will and should consist in the expansion of food production. Many parts of the world are relatively inefficient in their production and utilization of food because they do not possess adequate storage, processing, and distributing facilities. Increased use of insecticides, fertilizer, and machinery will contribute to the expansion of business in those supplies. Establishment of storage and processing facilities will furnish employment for technicians and laborers in those fields. Construction of roads and other facilities for transportation in many places, but particularly in such a country as China, will contribute directly not only to the more efficient utilization of food and to an expanding market for food but also to the production of other goods and to the development of new markets for other commodities. And all these, in turn, will contribute directly and indirectly to the stimulation of other production and services contributing to higher living standards.

What I have tried to do up to this point has been to describe generally the conditions and factors which give point to a new emphasis in our day on world-wide improvement in agricultural production and in the raising of nutritional levels. I have outlined the specific proposals for a permanent United Nations Food and Agriculture

Organization. But I have only suggested its relationships with other international developments. I should like now to examine and develop those relationships. The full significance of the food and agriculture program cannot be appreciated unless it is considered as but one part of a comprehensive and inevitably complex effort to organize nationally and internationally.

AN EXPANDING WORLD ECONOMY

The total world effort in one sense is and must be for an expanding total world economy. To expand the food economy is a most desirable goal in and of itself. But, while the food economy is an excellent place for expansion to begin, it can reach a maximum only if growth occurs simultaneously in all sectors of the economy. Action of national governments can contribute to such general expansion, and so can action by private enterprisers within each country, international action such as the extension of credit, and private action across international boundary lines. Governmental and intergovernmental action will enable private enterprisers to act more quickly, more substantially, and more effectively. There are a great many conditions favoring world-wide expansion of economic activity, even though one cannot deny the existence of impediments and difficulties. China and Brazil show promise of having especially dynamic economic forces. Similar possibilities are present in some of the plans for federations of certain small states, for tariff unions, and for reductions in trade barriers. If these plans become effective, these dynamic forces will be that much more pervasive.

RECOGNITION OF THE NEED FOR GLOBAL EFFORT

This hints at a part, but only a part, of what will be a global effort. It is extremely significant that so much recognition is everywhere being given to postwar economic arrangements. At the end of World War I, a quarter of a century ago, most of the thinking and the planning seemed to be confined to political matters. That must not and cannot be repeated this time. Yet these questions of economic opportunities and arrangements must be considered as parts of a very much larger picture, all the parts of which contribute to the whole. There are, as I see it, three main elements, distinct but related in this larger picture. They are collaboration, general political arrangements, and security arrangements. General political arrangements involve questions of boundaries, of federations, of the recognition of particular governments. As they touch the question of enemy nations, they become part of the field of security arrangements. The special arrangements for military security must be regarded as the fundamental, over-all arrangements on which the success of all other efforts will depend. Yet the security arrangements themselves will depend for completion on these other political, economic, and collaboration arrangements. It would not be appropriate for me here today to discuss either the political or the security programs. It is appropriate for me to emphasize the fact that the manner and the method for all the arrangements must be collaborative. We cannot make arrangements around a table, then go off and leave them as finished business. It is for this reason that collaboration is one of three distinct but related elements in the large postwar picture.

An expanding world economy could be so highly competitive as between nations as to cause stress and disorder. Even within nations we have come to realize that there are dangers in unlimited competition. Indeed, the establishment of government in its most elementary form reflected this realization. With the growth of affairs, in size and complexity, the need for ever better arrangements for their intelligent control has brought many developments in the social order. It is inevitable, therefore, that, when competition becomes competition between great, complex, and powerful nations, it will call for arrangements by and among the nations. It is plain that we have suffered in recent years from excessive international economic competition or, to put the matter in other words, from a lack of arrangements for its direction and control. It should be equally plain that competition between nations—as distinguished from simple competition between nationals of different countries—is growing and is becoming more acute and better organized, both actually and potentially.

A NEW RESPONSIBILITY OF GOVERNMENT

This is one aspect of socialization that has received too little consideration. We are all impressed with the growing power of great nations to make war, simply because of the development of new machines for waging war. But we have not pondered sufficiently the effects on international relations of an increased responsibility on the part of nations. So long as the price of wheat in the world seemed to be determined by an impersonal and irresponsible "market," producers who were dissatisfied about prices had no convenient or inviting target for their resentment. But when it becomes known that the price of wheat has been changed by conscious and definite governmental action, such as an embargo, a quota, or a subsidy to producers, then the resentment of dissatisfied producers can readily take the form of deep hostility toward the nation whose government took that action.

No matter what course we may take in the United States, it seems reasonably clear that there is going to be an increase, in the world, in the number and scope of actions taken by nations. Indeed, developments of this sort already clearly demand attention. Russia's international trade has been and will be 100 per cent on the basis of state trading. New Zealand's international trade was, before the war, about 85 per cent regulated or controlled by state action, and her citizens expect an increase in that percentage after the war. British Empire "preference" was a development for diverting trade by government action. Australia, Argentina, France, and many other countries were, before 1939, making a good many trade determinations governmentally. National monopolies, cartels, and tariffs all reflect this same trend. There are strong evidences in 1944 of tendencies to carry this development further very rapidly. It is commonly predicted that the economies of many European countries will be widely regulated or controlled by the state, perhaps even socialized. We may be sure that in many countries—China is an excellent example—people will show a new determination not to be buffeted about by winds generated in the world's principal economic-pressure areas.

To simplify the matter, let us imagine that all of the nations—or all but the United States—should adopt socialism. Under those conditions the competitive stresses between nations would have tragic potentialities of the most compelling sort. Arrangements for some regulation of their economic relations would simply *have* to be worked out by and between nations. From this it is evident that even now the development of governmental action in the economic field, as a result of internal needs and demands, has been carried so far as to demand international regulation of many factors in the situation. In mutual interest and for the sake of world order, collaboration must be substituted for competition in certain areas of international economic relations. These areas may be identified roughly by a list of terms: exchange stabilization, international credit, shipping, aviation, petroleum, commodity arrangements, trade policy, and tariffs.

THE NEED FOR INTERGOVERNMENTAL COLLABORATION

But if there is to be collaboration, there must be facilities for collaboration. Sir Arthur Salter in the conclusion of his history of Allied shipping control in World War I stressed the importance of collaboration in matters of common concern "at the working level," rather than waiting for problems and issues to become so acute as to require handling at the diplomatic level. It is an important point. Collaboration means working together. Facilities must be devised so that nations can work together.

Let it be absolutely clear that the basic necessity is for collaboration *between nations*. The fact that there is no way to deal with any economic interest group in Russia except by dealing with or through the government of the Soviet Union—and, of course, we desire to, and we must, deal with Russia—that fact only illustrates and emphasizes a cardinal truth: What we must consider and what we must arrange is *collaboration between nations*.

The plans for the F.A.O. must then be examined in terms of these considerations—in terms of other and more comprehensive arrangements for collaboration and common action by the United Nations. All of these essential new arrangements will have to be *intergovernmental arrangements*. There is no way of bringing a billion and a quarter farm people together in a community meeting. Most of the people of the world are organized in no other way than by or through or under their governments. There simply is no way to by-pass nations, but they should not be by-passed in any case. National values and interests must be given expression and integration through international, intergovernmental mechanisms. Your ticket and my ticket of membership and participation in the whole program of international co-operation must be your citizenship and my citizenship in the United States.

As we regard the food and agriculture proposal, then, we must realize that the first questions to be answered are questions of concern to nations as nations. They are questions about how governments may best work together in this particular field to their mutual advantage and satisfaction: What tasks can nations handle together? What things will nations permit an international organization to do? How will they vote? What will be the cost? How will that cost be divided? What will be the official language? Where should the seat of the organization be located? How can the procedures and arrange ments first made be modified in case that should become desirable? What is to be the structural form of the organization? Should it have an executive committee? If so, what countries should be members of it? And so on. Unless those questions are so settled that the answers will be accepted by many nations, nothing will happen. They are all questions to be debated and resolved by governments. Only if they are answered satisfactorily is it possible to open a way to common action in matters having to do with food and agriculture.

Meanwhile, similar questions have to be considered by the nations in connection with other proposals and other mechanisms. And all of the proposals need to be considered in relation to each other and as a whole. Do they together provide a sufficient basis for necessary collaboration? Are they individually acceptable, reasonably feasible, and promising? Is the total obligation involved a tolerable one? Is the apportionment of expenses in each case sufficiently reflective of respective interests and capacities? Is the total cost similarly satisfactory and not out of line with the value of the advantages likely to be gained? Are the various structural arrangements reflective of the varying interests and responsibilities of the different nations? Does the sum of these structural arrangements accord with desirable political principles?

The general problem of organizing for world collaboration is simplified, made more inviting, more soluble, by dividing it into parts and first addressing those parts separately. What is more, the results which will be produced by this approach are likely to be of superior quality.

If we were to try to create one over-all intergovernmental authority and to invest it with total responsibility for needed international collaboration, we should face a staggering problem, and there would not be much chance that our solution would be accepted by the governments or the peoples of the world. The powers ascribed to the organization would almost inevitably have to appear, or could be made to appear, to be much greater than those actually needed. With all of the international eggs of every nation in one basket, every detail in the structure and content of that basket would of necessity become a matter of the most vital concern to every nation. Dropping the metaphor, the point can be simplified by saying that details concerning voting arrangements, committee memberships, and staff leadership would become so important as—at this stage of history—almost to eliminate the possibility of agreement. *Continuing* agreement on these things could not be contemplated, at any rate, with any confidence.

Our need, therefore, is, first of all, to identify areas of important mutual concern where collaboration is needed and to provide for each field appropriate mechanisms for the kind and degree of collaboration that seem necessary and feasible in that field. The total effect will be considerably more than the sum of these separate efforts, yet the total grant of powers required will be less than for one over-all authority. Structural details, voting arrangements, and cost apportionments can be adjusted appropriately in relation to each function. In different fields the degrees of interest among the nations will vary and their responsibilities will vary. Much on the lips of diplomatic representatives of smaller countries in the discussion of security organization is the phrase, "equality of status, but not of function." They use it to insist that the Great Powers shall assume and live up to their great responsibilities. Maintenance of the status of the smaller nations, they clearly see, is dependent upon the full acceptance by the larger nations of special responsibility. Diverse organization in other fields, however, will provide fuller and more effective participation than a single pattern or a single organization could. It will be easier to see and to judge and easier to achieve.

The several international organisms will need to collaborate, too. They will need to be tied together in some fashion. Some zealots for agriculture and nutrition might feel that the Food and Agriculture Organization would get more support and more funds if it were to be clearly and definitely autonomous. But in the larger view the success of its special efforts in its special field is dependent upon the success of other efforts, the consistency and combined effect of other efforts. Therefore, the F.A.O. Constitution, without anticipating what other or more general organizations may be set up, provides very simply that the F.A.O. *shall* become a part of any superior, general international organization that may be established.

There is one other important point, although it is impossible here to do much more than to cite it. It is that the necessity for enlarged activity in the international field requires a development of national governmental facilities for international action. This is a subject few persons have considered. One never hears it publicly discussed except in rather incidental reference to the security arrangements. Yet it should be obvious that governmental institutions and procedures designed almost wholly to meet the needs of strictly internal functioning will have to accommodate themselves to a new situation. How can the United States in particular equip itself to function reliably, with assurance and with effectiveness, in day-to-day operations with other nations? This is an important and involved question which must be answered in the years just ahead.

The general line of thought I have presented reflects no decision, no fixed general pattern for postwar action. It suggests the complexity and scope of the problems that must be considered but points, by way of illustration at least, to possibilities which indicate that the problems are by no means impossible of solution. Concerning the general objective, there can be no serious disagreement: that there must be new facilities for international collaboration, both economic and political. For food and agriculture the first specific proposal has come. The proposal poses no important issues, and it contains no possibilities of an alarming sort. It is conservative, but constructive and important. I have no reason to doubt that American adherence to it will be voted by the Congress with no substantial dissent.

THE CONTRIBUTIONS OF A PERMANENT INTERNATIONAL ORGANIZATION ON FOOD AND AGRICULTURE

By ALLAN G. B. FISHER[1]

OUR attention has been drawn to a wide variety of concrete issues of varying importance, with each one of which it could plausibly be argued that a United Nations organization might properly concern itself. In any real situation which we can reasonably forecast today, however, it seems unlikely that any organization which may be set up in our lifetime will be able to grapple effectively with all these issues at the same time. We need some standard of reference by which we can construct an order of priority. The most useful course at this stage will be to raise some of the broader issues which must be faced in constructing such a standard. We must be careful that the organization is not sidetracked into backwaters and thus, even though it may become quite a respectable part of an international work-creation program, prevented from making the essential contributions which it alone will be competent to do.

Our task would obviously be much easier if we could assume the existence of an organization whose authority no government would question, whose financial resources would be unlimited, and which would be able to command at call the services of any competent man or woman whom the directors of the organization believed would add to the efficiency of its staff. No one of these conditions is, however, at all likely to be satisfied. Individual judgments may well diverge in their guesses about the practical limitations likely to be placed upon the permanent organization in either of the directions I have mentioned, and therefore about the contributions which it is likely to be able to make to the international handling of food problems.

F.A.O. NOT A SUPERSTATE

In the first place, it is doubtful that such a permanent organization will be permitted to assume in any real or effective sense any of the normal functions at present exercised by national governments, to operate, in however disguised a form, as the organ of a superstate.

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It seems axiomatic that it would be a waste of time for practical men to engage in speculations, which must be described as academic in the bad sense of that word, about what might conceivably happen if the world were something entirely different from the very awkward and prickly collection of sovereign states with which we are now so painfully familiar. We must, within limits, take the world as we find it, and one cannot picture in this generation the governments of, say, the United Kingdom or the United States taking instructions from any international organization as to the policies which they should pursue in the fields of food and agriculture. And one would be equally astonished if in these circumstances the governments of smaller countries, such as, say, New Zealand, the Netherlands, or Uruguay, were any more disposed to accept such instructions. These attitudes may be regretted, but they are undoubtedly facts.

We are, of course, happily under no obligation to assume that on the part of either the ordinary man or the statesman there has been no significant change during recent years in their thinking on these matters. Experience does sometimes teach, and statesmen have often solemnly declared their intention to profit from it. We should not be considering their questions at this time if we believed radical change to be impossible; but, while we should be careful not to pitch our expectations too low, we must be equally careful not to waste time over extravagances which in calmer moments we know to be impossible of realization.

DIFFICULTIES OF ADEQUATE FINANCE

This treatment would lack reality if we lost sight of the fact that the financing of organizations such as the F.A.O. is certain to present delicate and difficult issues. Already there are signs that governments are looking with some apprehension at the cumulative process whereby their obligations to participate in international organs of one kind or another are tending to grow. Sooner or later the budgetary problems of all these organizations, already in existence or planned for the future, must be examined as a whole; and when that is done it is not unlikely that the resources allotted to food and agriculture may fall short of the expectations of enthusiasts.

SHORT SUPPLY OF COMPETENT PERSONNEL

Perhaps most important of all is the question of personnel. It is clearly no use lightheartedly to assign to the F.A.O. tasks the performance of which will be impossible without the employment of men and women who, in fact, will not be available. It is perhaps deplorable, but it is indubitably true, that both archangels and supermen are in very short supply. There will not be enough of them to go around for all the tasks which are currently being discussed as suitable for international organizations to handle; and, with pressing claims forthcoming from many other sources, both governmental and otherwise, any international organization may account itself fortunate if it succeeds in enlisting the services of quite a small number of really first-class men.

With all these considerations in mind, a permanent organization should at all times, but especially during the first years of its life, strictly observe the primary economic principle of insuring that all its resources are used in dealing with matters of first-rate importance and that none are dissipated on matters which, however interesting, are of no more than third-rate importance. With this end in view it will carefully ascertain the most important elements which in any given case at present prevent the attainment of proper nutritional standards and then with equal care will distinguish between those elements the removal of which demands action in the international sphere and those whose treatment lies elsewhere. When it has done this, it must resolutely resist every temptation, however alluring, to divert its energies and the time and capacity of its limited staff to tasks which, however attractive in themselves, are not of primary importance or might easily and appropriately be undertaken by someone else. International organizations in the past have sometimes succumbed to these temptations, and enthusiasts who do not wish to allow any opportunity, however trifling, for doing good to slip by have not always been sufficiently on the alert to observe that sometimes the most effective way of insuring that an international organization will do nothing to offend the susceptibilities of powerful interests, governmental or otherwise, is so to overload it with numerous little tasks of third-rate importance that it is left with neither the time nor the energy even for thinking about more constructive and disturbing activities, much less for carrying them out. A permanent organization for food and agriculture will not grapple successfully with the intricate problems which face it unless at all times it insists on penetrating to their roots, that is to say, on being "radical," in the true sense of that word.

POVERTY THE MAIN CAUSE OF HUNGER

It is now a commonplace, and indeed has been well known to economists throughout my lifetime, that, as the Hot Springs conference proclaimed to the world in June, 1943, "the first cause of hunger and malnutrition is poverty"; the "radical" approach to our problem therefore demands that the F.A.O. should steadily keep in mind the basic fact that its ends will ultimately be achieved only if the general problem of poverty is effectively handled. If it is found that many people are not getting enough food, to many it seems natural to conclude that the most sensible course is to get straight ahead with the practical tasks of producing more, or of giving away to the needy supplies found to be superfluous elsewhere. In some important circumstances, e.g., war or famine, this reasoning may be sound enough, but a little reflection will show that these are not invariably the wisest courses to follow. If it can be shown that one would do well to consume more tomatoes or grapefruit, it does not necessarily follow that his deficiencies will most effectively be remedied either by growing these things for himself in his back garden or by arranging for them to be given to him by people who already have plenty. If, as is so often the case, his failure to consume enough of these things is due to the insufficiency of his income, the better course is to place him in a position where he can earn a higher income; and usually there will be little risk that food growers will not quickly respond to the increased demands for food which he will then be able to make effective. For it is equally a commonplace that agricultural producers respond as a rule much more promptly than industrial producers to even transient increases in the demand for their products.

Paradoxical as it may sound, some of the food and nutrition problems of our time arise because in certain areas there are too many food producers. If we want to insure generally high nutritional standards, it is usually more important to pay attention to the conditions which determine effective demand for food, to the general conditions affecting the levels of real income, than to the conditions of food production, though the latter, of course, are also highly important and cannot safely be neglected.

It is worth while emphasizing this elementary point, for if it is neglected there is a considerable danger that an international organization for food and agriculture may be converted into an agricultural racket. At the moment, there is perhaps little evidence of any great upsurge of interest among farmers throughout the world in the potentialities of international organization, but many who are enthusiastic for such things often feel obliged, and sometimes for good and sufficient reasons, to pay a good deal of respectful attention to the pressure of agricultural interests. It is not a matter of chance that the pressure to capitalize upon the natural and proper humanitarian sentiment which was shocked by the revelation of deplorably and unnecessarily low nutritional standards in many parts of the world should have come largely from people who were also interested in maintaining agricultural incomes, for an increased demand for food would obviously in most cases also be advantageous for farmers. We need not think any the worse of these people for being thus eager to get the best of both worlds; if the adoption of any policy will simultaneously raise both general nutritional standards and agricultural incomes, that should be a matter for rejoicing and not for cynical carping. But, unless it steadily insists upon the overriding importance of the organic links that bind together the agricultural and all other sectors of both national and international economics, any international organization is likely to find itself insensibly driven into a position where it will feel obliged to sponsor movements based upon nothing more than the pressure of special agricultural interests. These links are easily neglected, and in constantly emphasizing their importance and indicating their significance in concrete instances, a permanent organization would be performing a function which probably no other body could so effectively tackle.

LIMITING THE WORK OF F.A.O.

A permanent organization for food and agriculture should obviously not attempt to cover the whole of the wide range of issues raised by the fact of widespread poverty. That, too, would be a wasteful dissipation of its necessarily limited resources; and there will be, one may reasonably hope, other organizations specifically charged with responsibility for other aspects of the problem. Clearly an organization for food and agriculture must be mainly concerned with food and agriculture; the most effective way of improving nutritional standards is, however, often not by a direct attack impinging upon food itself but through some other reform affecting, in the first place, some other sector of the national economy. There are many areas where nutritional standards would be most effectively raised by making it easier for some of the at present surplus agricultural population to get away from agriculture and enter some other kind of employment; in others improvements will be slight unless there are radical changes in the trade policies of other countries which will permit radical changes in the pattern of international trade. An international organization should be in the most favorable position for assessing the varying importance of these and other factors and for pressing for appropriate action. No national organization is likely to be able to do the job so well, and any organization which started with a strong agricultural bias would almost certainly neglect many of the essential elements in the situation. It would be a highly important contribution to classify and differentiate the different countries and regions throughout the world from the standpoint of the variations in the relative importance of the influences which keep nutritional standards unnecessarily low. Such a classification would quickly show the futility of aiming at any formal uniformity in national food and agricultural policies. Parallel studies of policy in different countries have their value, and sometimes one country may with advantage be urged to imitate the practice of another. But this is not genuinely international work. Genuine international problems arise when the action or inaction of any country or group of countries affects the welfare or the development of other countries. There is an abundance of such problems in the field of food and agriculture, and it is primarily with these genuine international problems that an international organization for food and agriculture should concern itself.

The decision by the United Nations to set up a permanent organization for food and agriculture will register their recognition of the fact that each country has at least some responsibility for the nutritional and agricultural standards of other countries. It is important that the F.A.O. should do nothing to encourage the view that this responsibility is adequately discharged merely by pointing out to other countries, through the medium of the international organization, methods for improving their own internal economic systems. The methods which most readily come to the mind of the citizens of wealthy countries are in many cases quite unsuited for the more backward countries with quite different social outlooks and inadequate resources of their own. The responsibility can be adequately discharged only if each national government can be induced to realize that many of its policy decisions will often, directly or indirectly, have an important bearing on the food and agricultural conditions of other countries. It should perhaps be the main task of an international organization to keep hammering at this point. If its resources are scanty and its personnel inadequate, it should, however reluctantly, be prepared to sacrifice everything else as relatively unimportant and cling tenaciously to this, its essential and indeed unique function.

ADVICE AND RECOMMENDATIONS

An international organization should "press for appropriate action." How, in fact, is this to be done? If governments were willing to accept instructions from the international organization, that would be all to the good. It is hard to visualize this happening except perhaps in relation to certain quite minor matters. It should not, however, be too much to expect that national governments should cease to be shocked or scandalized by sober and weighty pronouncements by an international organization showing the repercussions, sometimes quite unexpected, of national policies upon the welfare of the peoples of other countries and, by advice based upon such pronouncements, indicating action, also sometimes quite unexpected, which might relieve the difficulties which have driven the country in question to international antisocial action and at the same time improve the situation of the peoples whose welfare has thus been damaged. If studies of this kind and advice based upon them were to become a routine activity of international organizations, it would certainly mark such a radical change as compared with the timid practices of the past as to deserve to be described as "revolutionary."

How far this can be carried obviously depends upon national governments, and how far national governments can be pressed in such matters equally obviously depends upon the ordinary citizen, of whom we here happen to be specimens. When orators dilate upon the potential functions of international organizations, one feels that what they really mean is that it would be very nice if the governments of other countries would do what they, the orators, told them to do. Each one of us has, however, much more responsibility for and should therefore be much more concerned with how far the government of our own country will be prepared to go in allowing an international organization to influence its policy. If that problem discourages us, the contributions which a permanent organization on food and agriculture "will make" to the international handling of food problems will be quite trifling as compared with the contributions which it "may make."

MAJOR OBSTACLES IN THE PATH OF INTERNATIONAL COLLABORATION IN FOOD AND AGRICULTURE

By HENRY C. TAYLOR[1]

AN OBSTACLE can be thought of only in terms of a specific objective. In order to delimit this discussion of obstacles to international collaboration in food and agriculture, it is necessary to have clearly in mind the functions to be performed by a world institution organized to promote such international collaboration.

It is assumed that the major functions of any international organization[2] dealing with agriculture and food would be to secure, integrate, evaluate, interpret, and disseminate facts of international significance relating to the food supply and to agriculture, including industrial raw material produced by agriculture and including statistics of international trade in agricultural products, as well as of production as influenced by climate, by soil, and by people and their equipment and methods of procedure. The data should also include reports on the national policies as they relate to grades and standards of quality or to bounties, tariffs, quotas, etc., which help or hinder the international flow of agricultural products.

It is assumed, further, that the functions of the world organization would include activities designed to stimulate the primary collection of facts by each of the co-operating nations with a view to increasing the data and improving their comparability and that the function also includes making objective and critical analyses of the agricultural and food policies of the various nations. Such analyses might lead to international conferences intended to help the leaders of each co-operating nation to understand how their domestic policies affect other nations. This, in turn, should lead to diplomatic conferences which may negotiate international agreements relating to food and agriculture intended to benefit all nations.

Obstacles which retard the attainment of these ends are as follows:

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[1] Director, Farm Foundation, Chicago, Illinois.

[2] The constitution which has been prepared by the Interim Commission on Food and Agriculture for a new world Food and Agriculture Organization was not available to the author at the time of writing.

(1) functional difficulties within the organization and (2) difficulties arising from the diversity of conditions and ideas in the participating countries.

FUNCTIONAL DIFFICULTIES WITHIN THE ORGANIZATION

Difficulties arising from the diversity of languages.—(1) An international organization may use two or possibly three languages, but the use of more than one language is cumbersome; and even where two languages are used there will still be a vast majority of the participants who are under the necessity of participating in the collaboration through the use of a language other than their native tongues. (2) But, besides these difficulties arising strictly from the language itself, there is the further difficulty arising from the fact that the mode of expression in any language always is rooted in the cultural background of the person by whom it is spoken. Even concrete statements, to say nothing of those more literary in nature, can be interpreted only in terms of the background, experience, and environment of the listener. For instance, the word "pig" means one thing to an Iowa farmer but an entirely different thing to a Moslem or a Hindu. (3) Failure of complete understanding due to linguistic difficulties provides a fertile soil for suspicion on the part of one delegate or a group of delegates with respect to the actions of other delegates. This, of course, further retards mutual understanding.

Difficulties arising from differences in points of view.—Each person is likely to join the collaborating group with a particular set of national problems in his mind on which he would like to have help. It is difficult for him to step aside from his national point of view and take a world point of view so that any remedy which he proposes will be such as will promote the interest of all nations. The International Institute of Agriculture, an outstanding example of international collaboration, provides thirty-five years of experimentation which may be utilized in planning future collaboration in food and agriculture. At the International Institute of Agriculture the small nations, in whose homelands but little scientific research in any field of agriculture had been carried on, desired that the Institute become the agency to take care of all phases of scientific work relating to agriculture, whereas the larger countries with highly developed departments of research were interested only in having the Institute deal with matters of an international character.

The differences in the temperaments of the representatives from various *parts of the world obstruct mutual understanding.*—Some of the members of a collaborating group will present what they have to say in terms which may be described as coolly intellectual, while others express themselves in terms primarily emotional. The former asks for action on the basis of fact and logic. The latter asks for action as a friendly gesture. It often proves difficult for people of these different temperaments to understand each other, and particularly is it difficult for the coolly intellectual person to understand the importance of dealing diplomatically with those of an emotional temperament. These differences often result in internal feuds which last for years and greatly retard the progress of the work.

Differences in the training and interest of those who participate in the board of control of the collaborating agency obstruct action.—Those who, in 1933–36, were brought together in the Permanent Committee of the International Institute of Agriculture in Rome represented great diversity of training and interest. Out of about forty representatives there were a few with scientific training in the fields covered by the work of the Institute. Some of the members were professional officeholders who chanced to be sent to serve at the Institute. By far the greater number of the representatives were persons from the legations who were in Rome for other purposes and who were sent to the meetings of the Permanent Committee to represent their countries without understanding the basic purposes of the Institute. The time required to educate these members was often very great and constituted one of the real obstacles to carrying on the business of the committee.

The fact that some of the delegates have economic training and others training in diplomacy results in grave difficulties in carrying on the work of the Institute. The contrast between the International Conference of Agricultural Economists and the Permanent Committee of the International Institute of Agriculture with regard to the way in which the representatives could do group thinking may be explained, I believe, largely in terms of this difference in the makeup of the two bodies. The former was made up wholly of well-trained economists representing many lands. The latter was made up of people of diversified training without a common background training in the sciences relating to agriculture. It is especially important, therefore, that the objectives of an international institute be thoroughly clarified in advance and the delegates selected with a view to meeting the needs of the undertaking.

In a group brought together on the board of control of an international organization there are usually some who have a "will to power." They cause much trouble and may prove a major obstacle to the progress of the work.

DIFFICULTIES ARISING FROM THE DIVERSITY OF CONDITIONS EXISTING IN THE VARIOUS COUNTRIES

Basic differences of opinion on very great numbers of subjects will arise because of the differences in the birth rate, the rate of increase in population, and the resulting differences in the degree of population pressure in the different countries. During the three years that I kept in close touch with the International Institute of Agriculture and with Italian life, one thing that impressed me regarding the Italians was their feeling that they were suffering greatly because of the decline in emigration and with it the decrease in remittances from Italian emigrants in foreign lands. This situation had a profound influence upon the national agricultural policies of Italy and in turn upon the attitude of Italian delegates with regard to the kind of work to be carried on by the Institute.

Every country has its special-interest pressure groups, which, in turn, have much influence upon the legislative and executive bodies of those countries, which, in turn, profoundly influence the attitudes of the national representatives of any collaborating group. Attitudes of this kind will determine the kinds of special research that can be carried on, and especially will they influence the efforts to stimulate the establishment of international grades and standards for food products, lower tariffs, etc. Experience in connection with the establishment of universal standards for American cotton leads to the belief, however, that, while private-interest groups will put up strong resistance to changes which will make their services less essential to successful trading in the international market, these special interests are more easily handled on an international basis than within a single nation. In the case of cotton, the countries spinning the cotton lined up with the producing country to take action which would reduce marketing costs. Furthermore, in this case many, but by no means all, of the Liverpool merchants who believed they would lose heavily on arbitration fees if universal standards for American cotton were adopted, nevertheless favored their adoption because they recognized such action to be in the interest of the cotton trade of the world.

The kinds of agricultural products a given country desires to export and the kinds of products it desires to import greatly influence attitudes of the representatives of that country with respect to the fields of research that should be entered upon. It is only when the delegate takes the world point of view that he is able to work effectively on an international committee that is trying to render a service that will be of use to all countries. Fortunately, a majority of the countries are interested in most of the food entering international trade, from either the export or the import point of view, but there are some important exceptions. In 1934 the General Assembly of the International Institute of Agriculture decided to publish a series of monographs on specific products entering world trade. The experts of the Institute looked over the field and decided upon a series of monographs, the first of which was to be on international trade in pigs and pig meat. When this came before the Permanent Committee for approval, the delegate from India and the delegates from Moslem countries all objected strenuously to starting this important series of monographs with a subject which was not merely of no interest but actually repugnant to the citizens of the countries they represented.

The ideas held by the peoples of the various countries with respect to the economics of foreign trade profoundly influence the participants in international collaboration. The idea that to export goods is desirable but to import goods is undesirable is one sample. The idea that tariff barriers protect the standard of living of the people is another equally strange but powerful obsession. You can supply many other examples.

Another factor which influences the representatives of various countries with respect to the interest they take in various phases of the work of an international institution dealing with agriculture and the food supply is whether they are on a surplus or a deficit basis and the extent to which the agriculture is still in the self-sufficing stage and the extent to which it has entered the commercial stage.

Variations from country to country in the standards of living of the people, the percentage of literacy, and the resultant interest or lack of interest in world trade constitute major obstacles to international collaboration and are in danger of leading to imperialistic rather than democratic international relations.

The *kind of people we still are*, throughout the world, is the greatest obstacle to international collaboration. That is the reason why, here in the United States, labor, agriculture, and business have not learned to collaborate *satisfactorily* for the common good; that is the reason why England and India have not been able to agree; and that is why China is not yet a united nation.

Let us for a moment visit the Hall of Man in Chicago's Museum of Natural History. Let us look at the one hundred types of mankind that have been reproduced in bronze by Malvina Hoffman. With these specimens before us, we should ask, "How many human beings does each type represent and how do the differences in the qualities of men affect international collaboration?"

CONCLUSION

All these obstacles to international collaboration have been mentioned because they need to be understood in order that they may be overcome. International collaboration is essential to the existence of peaceful business and political relations. A splendid place to practice on such collaboration is in the field of food and agriculture. Once the nations have learned the art of dealing successfully with the problems involved in this sphere of action, they will the better understand how to proceed with the more arduous tasks of dealing with political relations.

OBSERVATIONS OF PARTICIPANTS

John D. Black (Harvard University): The emergence of more favorable terms of trade toward agricultural products may come a bit slower than Professor Mason suggests. The basis for such an improvement, as he indicated, is, of course, the industrialization of other parts of the world. Historically, however, the industrialization of a country has almost invariably been accompanied by an agricultural revolution, and agricultural production has expanded at the same time. Only after the industrialization is well advanced are more food imports needed.

Another point: Professor Mason spoke of international commodity agreements as not being necessary to expand trade and production of raw materials. Broadly interpreted, however, they can contribute to an orderly expansion of agricultural production. The nations need to collaborate in an orderly, planned expansion of the kind of agricultural production that is wanted.

J. M. Letiche (University of Chicago): It is rather unfortunate that we have not emphasized sufficiently the interdependence between the industrial and the agricultural segments of the economy. In the United States from 1895 to 1915 the industrial segment of the economy expanded about 6 per cent per year and the agricultural segment about 2 per cent. This solved the agricultural problem at the time. The terms of trade, under such circumstances, favored agricultural products. Mr. Mason believes that the terms of trade after this war will also be in favor of agricultural products. His conclusion may not follow, for the following reasons:

1. Under wartime full employment our price controls were relatively inflationary in the agricultural segment of the economy. There is good reason to believe that if the controls had been as lax in the nonagricultural segment, terms of trade would have been against agricultural prices. The war experience does not prove that high levels of employment must lead to relative terms of trade in favor of agriculture in the postwar period.

2. Agricultural countries will unquestionably industrialize, but it will not be at the expense of the agricultural segments of their economy. The results may be analogous to those in the United States under the A.A.A. program—that when industrialization sets in, we will

have greater outputs in segments of the agricultural economy. Since we have excess supplies of labor on the farms, the innovation of machinery will probably result in a greater output of agricultural products with a reduced quantity of human agents on the farms.

3. The United States will unquestionably be the greatest exporter of capital to backward countries, but what kind of goods will they want? They unquestionably will need machinery, "know how," and our industrial products. It is very difficult to see that the backward countries will, in the short run, have a comparative advantage as far as industrial products are concerned. They will therefore produce more agricultural products.

4. Mr. Mason's fourth point was that central Europe had an excess labor supply on farms, that their agricultural segment of the economy is highly protected, and that the reduction in tariffs and liberalization of the entire commercial policy may result in the terms of trade moving in favor of agricultural products.

The protection of agricultural products in central Europe is very unfortunate, and the extent to which those barriers can be removed will ameliorate the situation. But, first of all, as far as those countries are concerned, if their tariffs are reduced and the agricultural prices in those countries come down to the level of world prices, the terms of trade of agricultural products in those countries will go against agricultural products.

EDWARD S. MASON (Harvard University): It is, of course, not possible, on any sort of statistical basis, to come to an irrefutable position as to what raw-material terms of trade are likely to be.

MR. BLACK: The first effects of industrialization are an increase of population, such as happened in Europe with its industrialization; from this large growth of population can come a reversal of terms of trade—not in the near future, but in time.

G. B. L. ARNER (United States Department of Agriculture): Nationalistic controls are going to continue after the war. We are going to have two-price systems and trade restrictions of various sorts, and it will be necessary to devise some means in the way of planned organization to cut across those restraints and make possible a continuance of trade in raw materials and agricultural products.

If we do not cut across these barriers in some way, trade will go largely to the countries which can pay the greatest subsidies and to the countries which offer the greatest advantages, regardless of the economic factors.

International commodity agreements as we have known them in the past have been largely restrictive. Nevertheless, that will not necessarily be true for future commodity agreements. If there is equal representation of both producer and consumer countries and effective consumer representation, not representation simply by the interests involved in the consumer country but of the consumer country itself, then we are relatively safe from the dangers that the commodity agreements in the past have presented. We need an international commodity organization which would control commodity agreements in the postwar period. Such an organization should not be subordinate to the proposed commercial-policy organization. There is a large field in the future for international commodity agreements which will lead to expansion and not to restriction.

PERCY BIDWELL (Council on Foreign Relations, Inc.): Why is an international agreement necessary to bring about expansion of production and trade and just how is it to be accomplished?

MR. MASON: We are not likely to return to a laissez faire free-trading position even of the sort that existed prior to the first World War. There is quite a large role for international commodity agreements, even of a restrictive sort, in the postwar period. What is needed, though, are international agreements which, in general, are oriented in the direction of an expansion of world trade, of the development of backward areas, of the export of capital; organizations and actions of a sort that are foreshadowed by the International Stabilization Fund, the International Bank, and the International Food and Agriculture Organization. International arrangements of that sort seem to me to be highly desirable.

Undoubtedly, however optimistically one views the future, there are going to be serious surplus problems in certain areas. In those areas international commodity agreements are necessary, and that is the area to which they are appropriate. It has been said several times that international commodity agreements, an international commodity organization, should be favored not because there is a problem of surpluses to be handled but because there is a problem of expansion of output that ought to be undertaken.

It is not necessary to set up an international commodity organization in order to accomplish an expansion of output. The people that are concerned with international commodity agreements are in the main producer interests. Consumers, you say, are going to be represented. We have, however, a long domestic history to the effect that it is probably impossible to get anything like effective consumer representation in a case of commodity-control schemes, and it seems to me that there is every reason to believe that that will continue to be true in the international field.

We should not expect an international commodity organization to throw its weight in the direction of an expansion of agricultural output, nor are international agreements necessary in order to accomplish that; or, if international agreement is necessary, it will be international agreement in the direction of maintaining incomes in various countries, of accelerating industrialization, and other things that lead to expansion.

Mr. Black: We do not need these arrangements to encourage the expansion of agricultural production. We do need some help, however, in guiding and directing such expansion. In the past, agricultural expansion has tended to be disorderly. In particular it is inclined to develop in areas where capitalistic methods can exploit virgin resources. Sugar is a case in point; rubber is another one. To make the expansion more orderly and to proceed along the line of more desirable development, commodity agreements can be very useful.

Secondly, it certainly follows that what we would like to see is orderly expansion oriented to the needs of improved nutrition, and there needs to be guidance in that direction. International commodity arrangement can be useful in orienting the expansion of production toward desired lines and away from the lines in which we tend to create surpluses.

Theodore W. Schultz (University of Chicago): Let us move the premises as to future agricultural surpluses more toward the pessimistic side, including a drop in terms of trade of agriculture relative to industry. When they drop because of changes in cost, it is appropriate; when they drop, however, because of the clogging-up of resources in agriculture, that represents economic waste and presents a problem.

However, even with a more pessimistic formulation of the problem, doesn't Professor Mason's analysis stand up? It is applicable not merely to optimistic notions of what may be ahead; it is just as relevant and perhaps one may argue more relevant, with one or two modifications, when applied to a less favorable view as to what may be ahead.

Where small producers are involved—farmers producing wheat, for example—the case for a commodity agreement is to get income stability. Certainly, there are more appropriate measures for keeping income somewhat stable than a commodity agreement.

MR. MASON: With respect to the United States, take cotton; it certainly would be desirable to maintain producer incomes. It would certainly seem to me to be a desirable thing to let the price of cotton fall to the world market price, to maintain the income of cotton producers, and to get an expansion of American cotton exports on the basis of a price competition which has nothing to do with an international agreement for dividing up a limited market for cotton.

There are certain aspects of this problem, though, that give me pause. In the case of monoculture countries, the question of maintaining producer incomes is very frequently tied to the exchange position of that country. Their whole yield in terms of foreign exchange, or practically the whole of it, is dependent upon their exports of a particular crop. It probably does not lie within their capabilities to maintain the incomes of their own producers singlehanded or to maintain the yield of foreign exchange on which the country as a whole must rely for its imports.

MR. SCHULTZ: Can commodity agreements handle that problem of countries dependent on one crop?

MR. MASON: It is not the best way to handle it. A properly managed exchange-stabilization fund is a better way to handle it than commodity agreements.

Even if the future does not turn out to be optimistic, international commodity agreements had better be held down to a rather small area and definitely assigned a subordinate role within a general commercial policy program which is oriented in quite another direction.

MR. BIDWELL: I think we could probably classify Mr. Stinebower among the optimists. He has introduced a new idea of classification, to my mind. Some of us are intent upon the immediate aspects of these problems and some upon the long range; some upon the particular aspect and some upon the general. To me it seems that the general view and the long-range view tend to coincide. The subject is now open for discussion.

M. R. BENEDICT (University of California): While we have from time to time recognized the difference between the short-run and the long-run problem, there has been a good deal of shifting back and forth. We would make more progress if we were to be more explicit. We will have one problem in the transition period—say, over the next five years. Then we have another problem, looking ahead a decade or two.

MR. BIDWELL: Is there agreement that for the immediate postwar period, the outlook for food producers is pessimistic?

MR. MASON: It is necessary to distinguish between the two or three years immediately following hostilities and the period of five or ten years after that. It seems to me that immediately following the war there are going to be some pretty serious food shortages.

MR. BENEDICT: We have two segments to the immediate postwar problem. One is feeding of people right after the close of hostilities; after that we have a prospect of rather heavy surpluses.

MR. BLACK: Does anybody think that the shortage of food will extend to a third year after the war?

KARL BRANDT (Stanford University): The world may be facing a surplus in some basic food commodities within a few months after cessation of hostilities in Europe. Great Britain will have no interest in retaining oversized war stocks. The flow of trade in the British Empire will require the storehouses not to be clogged valves but to let the goods pass through while keeping some stock piles. Moreover, European agriculture is not disastrously depleted and is likely to recover faster than many people think.

MR. BLACK: It is important to distinguish between the immediate supply situation, in the next year or maybe two years, and the long-run supply situation. Dr. Brandt apparently thinks we are going to have an abundance of food during the next year or two. I don't. I also differ from him as to the time it will take for recovery in Europe. I doubt, however, if there will be very much of a shortage of food during the third year after the war ends in Europe.

MR. SCHULTZ: After World War I this country took strong measures of a nationalistic sort as soon as farm prices declined. Is there some way of avoiding this? Are we likely again to have a sharp nationalistic turn in policy as a consequence of a break in raw-material prices, particularly in agricultural prices?

LEROY R. STINEBOWER (Office of Economic Affairs, Department of State): We must try to avoid these domestic measures which have a nationalistic effect. Certainly there is no doubt that the pressures of domestic producer groups will be as strong as they ever were if we do get into a situation of declining prices. The only answer to that is that we shall have to recognize the strength of those pressures and to some extent the economic and social justification of those pressures. They are never as well justified as the arguments that are made for them, but there is a very real underlying need. The important thing is that if the public and the government have a program which can assist in a transitional period and have goals of adjustment and shifting of production into lines which have some prospect of maintaining themselves ultimately without support, we may be able to get out of these transitional controls.

But if we simply take a piecemeal approach and find that the wheat farmer of this country is producing more wheat and would like to produce even more and is quite satisfied to produce it so long as his income is assured and we do nothing to stimulate shifting him out of wheat, and similarly if we take one industry after another in industrial reconversion and adopt tariff protection because that seems to be the easiest way, it seems to me we quickly get ourselves into a situation from which we cannot extricate ourselves without a major surgical operation.

ARTHUR C. BUNCE (Division of Research and Statistics, Federal Reserve Board): With the experience of the farmers of this country and the fact that the war did bail out the Commodity Credit Corporation just in time, how are you going to obtain in a democratic country an objective, long-run point of view so that the immediate pressures will not simply mitigate the possibilities of developing the sort of world expansion of trade that Mr. Stinebower is seeking?

MR. STINEBOWER: A hundred and fifty years of distinguished and disinterested thought have been trying to persuade the population of the world along the lines of this analysis, and it has to be admitted that, except for a short period in the middle of the last century, they have not had a great deal of success. It seems to me that the answer lies in part in the rewards that are offered—they are long-run in nature, their achievement is too long for the average individual to wait for. This has led to a complete disbelief in the efficiency of the price mechanism and market mechanism as a means to help adjust production. It has led to public intervention for the support of particular groups, first simply in the form of tariffs and then much more directly in the form of trade controls and complicated domestic controls.

The thing that always goes wrong and makes these controls self-perpetuating is that while they are designed to buttress a distress situation there is no way of relaxing them because they do nothing by themselves to shift production out of areas where it is not proving efficient.

If you have a program which is not merely piecemeal, if you have a program which offers some assurance of sustained income, and if you offer some inducement to make shifts in production, it seems to me that much less expenditure of public funds and public energy will be involved over a period of a decade than is involved in trying to bolster up distress situations.

MR. BIDWELL: The trouble with plans for getting away from government intervention is that we can't do it successfully without more government intervention. If we build up distortions in our economy through ill-advised government intervention, as we have done with tariffs, it is just plain stupidity as well as injustice to pull the structure down and say to the business interests who have accommodated themselves to it, "Now take care of yourselves."

The fault of tariff reformers has been that they expected to cure a situation of government intervention by a big dose of laissez faire. It cannot be cured satisfactorily, as I see it, without another dose of government intervention. But that dose ought to be so prepared and so administered that it will actually cure the situation and get back to what we think of as the most economic utilization of resources. To tell people in the woolen industry, "We have protected woolens for a hundred years but now we have decided we don't want to do it any more. You go around and look for another job," results, naturally, in their fighting to protect their position, and they will be able to persuade the public at large that they have a justifiable position.

ALLAN KLINE (president, Iowa Farm Bureau Federation): The question is: How are we going to develop programs for relieving distress situations in agriculture and improving agricultural incomes which will eventually work out and into what seems to be desirable from a domestic and an international trade standpoint?

It is one of the major problems of our time—half-economic and half-political and maybe the political half is the larger half. The political thing is itself complicated not only by the people who are advantaged by the programs as producers but by the fact that the people who operate the programs themselves become politically inclined. If we agree that programs such as agricultural programs are a necessity, it is advisable to devise means of having those programs administered not as political agencies. On the other hand, there are reasons to hope that we are beginning to learn techniques which will operate, that we can take care of the necessities of the time in assisting the domestic economy to be balanced and to maintain fairly well-balanced income and fairly complete employment—the first essential of any success in the international field.

MR. STINEBOWER: There has been a rather standard form of analysis that subsidies are preferable to tariffs because their costs are so much more readily seen and in time people get tired of paying taxes which are, in turn, paid out as subsidies to particular producer groups. We may have, however, to revise our attitude toward that issue on the basis of the experience of the last ten years. Particular groups in this country have no more objection to taking their rewards in the form of direct payments from the Treasury than they have in taking them in the form of hidden protection. There is this qualification: Producer groups are very reluctant to take income support; they want price support. They want to get their incomes through the market, to make it appear that the market price for a commodity is such as to justify their producing it. They do not want to get part of their income through the market and another part through a supplemental payment.

MR. MASON: It seems to me that this antithesis between laissez faire or market control of prices and agriculture versus governmental control is completely a false issue. The only question at issue here is what kind of controls are you going to adopt? The American people are completely sold on the notion that agricultural incomes have got to be maintained through the activities of farm groups and others. What they are not sold on is the idea of maintaining those incomes by price supports, and the reason they are not is that under a system of that sort we are rapidly losing and will continue to lose export markets for the agricultural products we can and should maintain. Tho other reason is that those prices do not serve as an effective guide in the consumption of agricultural products.

Now, if you can allow the prices of agricultural products to fall to world market levels, we can certainly maintain our exports, and we can certainly go a long way toward achieving what we all want to achieve—a more adequate consumption of foodstuffs and agricultural products in general.

If at the same time the discrepancy between the world market price and what is thought to be a fair price for agricultural products is made up by the government, there should not be any substantial opposition to a program of that sort in the United States.

If, on the other hand, we follow out this policy of attempting to maintain agricultural incomes by price-supporting measures, then we are running counter to what seem to me to be the broad lines of American interest and broad lines of American policy that should be followed.

MR. SCHULTZ: It is significant that in this country the three major farm organizations continue to throw their weight in favor of a declining farm population, which is different from the feeling in similar groups in some other countries.

MR. MASON: We have to distinguish, when we talk of price and the various functions it performs, between price as a determinant of income, price as a determinant of consumption, and price as an allocator of economic resources. In the field of agricultural controls, these three functions must be recognized. We should lower price as a determinant of agricultural income (to support prices) and pay more attention to price as an allocator of economic resources and price as a determinant of consumption.

MR. SCHULTZ: Professor Mason's comments again focus attention on the objection to income parity. The importance of price in allocating resources is a function to be seen and re-established in agriculture; this is terribly important. It remains to be seen whether we will return and actually look on prices as the primary way of getting resources moved and shifted. Price to channel products into consumption at home and abroad is going to be frustrated by support prices. Cotton people are beginning to ask themselves what they have done to their own internal and external markets. In agriculture income payments tied to products really aid only about half of American agriculture—roughly, three million of the six million farmers. There is a large group of farm families for whom price policy can do little.

P. LAMARTINE YATES (United Nations Interim Commission on Food and Agriculture): Suppose that all agricultural prices in this country were brought into line with world prices; in other words, all support were withdrawn and the tariff protection on all food imports was also withdrawn. What would be the change in the volume of agricultural production and in the numbers of persons engaged in the agricultural industry in this country?

MR. STINEBOWER: There is no off-hand answer. The question, however, needs to be put with these "if's" in it—if the United States were to withdraw all its protection and all its price supports and if simultaneously the other protecting countries, both importing and exporting countries, would take similar steps. It is not merely a question of action by this country alone. We should not get into such a self-castigating state of mind that we begin to think that it is only our policies that are involved. Twice in a generation we have expanded our production very substantially on behalf of the food needs of other countries who were our Allies. This has aggravated our agricultural problem and gives rise to the view that we and the other food-exporting countries should not alone bear the major brunt of the readjustment. We need to re-examine the domestic policies of England and the countries on the Continent as well as here.

Without giving a quantitative answer, the size of the readjustments is much smaller than it looms in the fears existing in the popular mind.

HOWARD TOLLEY (United States Department of Agriculture): The authority in the proposed constitution is enough to do a lot of things. The funds asked for in the proposed constitution form the amount the Interim Commission had the nerve to ask for upon the advice of such men as Mr. Fisher and myself. As to personnel, one is really surprised at the way the most competent people in the world have served gratuitously with the Interim Commission.

The F.A.O. can do a lot to improve the agricultural and food statistics of the world. According to its constitution, it has the authority and the power to make recommendations to individual governments and to other international bodies. For instance, it could make recommendations to the proposed investment authority with respect to loans to be made to particular countries that would help food and agriculture in those countries. Then, too, the F.A.O. will have the authority to initiate and push international arrangements with respect to commodities or groups of commodities, provided another agency is not in the field for that purpose. These are opportunities. There will be authority, funds, and personnel available to start right away doing things that can have a real influence on events.

WALTER W. WILCOX (University of Wisconsin): What would Dr. Fisher tell Greece that the F.A.O. would do?

A. G. B. FISHER (Royal Institute of International Affairs, London): One would like to say, "F.A.O. is already engaged in formulating recommendations which will lift some of the heaviest burdens which have prevented the appropriate growth of Greek national income, with special reference to the food and agriculture side."

Mr. Black: What do you think the assignment of the F.A.O. is in the matter of raising national income and curing poverty? Do you think that that is the responsibility of the F.A.O. as such, or is that the responsibility of other international agencies more than of F.A.O.? We have said a good deal about the importance of industrialization. Is it the responsibility of F.A.O. to industrialize the country?

Mr. Fisher: The F.A.O. certainly will not set about industrializing in the sense of arranging programs itself. It will not have the money to do that. But if it felt in any particular case that a certain kind of industrialization project had a particularly close bearing on the nutrition and agricultural situation, then it would be quite proper for it to make representations in the proper quarter.

Mr. Black: If the F.A.O. got drawn off into dealing with problems of that sort, it would not be doing what it was set up to do. Anything that the international F.A.O. can do in the way of improving the food and nutrition of Greece, or any other country, is very seriously limited by the incomes of the people in that country. The F.A.O. must all the time keep its eye on the problem of income and dovetail its efforts with those of other agencies that are trying to raise incomes. But F.A.O. has enough to do without taking on the general problem of raising the national income.

Mr. Bunce: Dr. Fisher has painted a picture of the international organization as a sort of a small watchdog to bark when anything occurs which appears to be disturbing another country. Can you not envisage something much more vital and fundamental than just making recommendations to individual nations?

Mr. Fisher: In the course of time, the F.A.O. should be much more than a watchdog barking when something goes wrong; but unfortunately, to begin with, there would obviously be a good many things that had gone wrong, and it would have to do a good deal of barking before things were reasonably smoothed out. One cannot very profitably lay down beforehand the technique or the machinery whereby advice can most prudently and effectively be brought to bear, but there is a wide range of choice open, and one would be guided by experience.

John B. Canning (War Food Administration): As the constitution of the F.A.O. is laid out, it gives room to find itself. If the child is really as smart as its parents, there will be plenty to do, plenty of constructive spot jobs and long-term jobs to do. If it is as smart as its parents, it will know while it is still pretty young that there is a great deal to be accomplished by way of emulation. Where it finds a good job being done, it can hold it up for the inspection of other countries. The International Labour Office, for instance, does hold up for all to see the successive shifts that have been made in the direction of its original terms of reference; and there can be no doubt that it has been very much more influential in its sphere than anyone at first expected.

MR. FISHER: As to the parents of this organization. It has multiple parentage, forty-four nations. What is the usual result when you have multiple parentage? It may very well be neglect even more serious than when just the ordinary sort of parentage is involved. The forty-four nations have to put up the money to keep the child alive.

A. J. CARLSON (University of Chicago): This plan to have a report on the state of nutrition from every country in the world seems to be excellent, but it will depend on who makes the report. Do you plan to set up standards that will unify the reports from the different countries?

MR. STINEBOWER: Is there not some reassurance for that fear in the start that has already been made? The *Final Action* of the Hot Springs conference and the various papers that were introduced into that conference which, unfortunately, have not been released for publication, are so far from being either polemics or political documents that one could almost address the criticism to them that they are valueless except to a scientist.

R. E. BUCHANAN (Iowa State College): In the constitution for the F.A.O. it is not anticipated that there would be a permanent resident commission, is it?

The situation, therefore, would be quite different in that respect from that which obtained in the group at Rome. There also would probably be a director-general with a secretariat that would have considerably more independence than they apparently had at Rome.

MR. FISHER: Broadly speaking, what Dr. Buchanan suggested is the case. In this respect, the plan for the F.A.O. is much more like the I.L.O. than the International Institute at Rome. The governing body would be representatives of states and not a committee in permanent session.

MR. BUCHANAN: One of the things that the new F.A.O. could do and quite definitely would be set up to do would be, upon the request of the nation itself, to appoint a technical commission—one that would be entirely agreeable to the country concerned—which would work in the country concerned, make a very complete and adequate study of the situation, and give them all help possible. It should be remembered, too, that the extraordinary privilege will be granted, we hope, to this organization to make recommendations and suggestions to governments even though they have not asked for them.

Another thing which is particularly interesting to the men from some of these countries—for example, China. They are extraordinarily anxious that there be international co-operation in doing certain things that would be useful to them. For instance, one of the Chinese is a plant-breeder. From the standpoint of Chinese agricultural development, he feels it would be important to secure and maintain at one, two, or three places in the world *all* of the strains of wheat which might be collected or developed, a storehouse to which workers would have access for securing background or basic material for their breeding programs. This might result in setting up various types of international *regional* laboratories for doing particular types of things, a great many bits of international regional co-operation which would not interest or include all nations.

C. L. STEWART (University of Illinois): In 1938 in attending a meeting of the International Institute of Agriculture at Rome and a meeting of the International Confederation of Agriculture at Prague it was impressed upon me that it was government officials all around at Rome; it was farm-organization leaders all around at Prague.

The government officials were restrained in these various ways that have been described. The group at Prague were more vital. The farm-organization leaders, interested in a co-operative approach to problems, were dealing with the problem of poverty and manual labor in agriculture and using some formulas that are not any too well known yet in this country. They had no co-operation from the English or from the Americans; it was a purely Continental group. Is there likely to be any possibility of getting the farm organizations themselves interested in the activities of the F.A.O.?

MR. FISHER: That raises a very vital issue which has caused a great deal of careful thought. In the last resort the responsibility for doing things does rest with governments. Far from getting anything done by keeping government officials out—well, it's not the best way. The I.L.O. tried to meet this difficulty by its celebrated tripartite arrangement, with joint responsibility shared by governments, employers, and workers; and many people have been attracted by the same idea in relation to the F.A.O. There are two reasons against that procedure. First, it is extremely difficult to think of suitable balancing interests for the F.A.O. The farmers are an obvious group. But who can speak for the consumers? They are not organized. The co-operative movement has been suggested, but that is inadequate because in many countries co-operatives do very little and at best they are still only a segment of the population.

The second, and the more important, reason for not having a tripartite structure depends on how seriously one takes the fear that the F.A.O. may degenerate into an agricultural pressure group.

MR. KLINE: Dr. Fisher is concerned lest agriculture be represented in an international representation on food and agriculture because they would be biased. Now we do not have anything to worry about in the United States as this thing is set up because our representatives are not only diplomats but they are the best-informed people on agriculture in the United States! They admit it themselves! The only people in the United States who might deny it would be the farmers!

MR. BENEDICT: As to personnel, it has been recognized for a long time that for a competent man in the prime of life to go into the foreign field he must, in most cases, plan to stay there, making it a career for life, because he gets out of touch with the work of his own country. If he stays away many years it is difficult to make the adjustments necessary for getting re-established in his own country. An organization of this kind obviously must have an able and vigorous permanent staff, but it would seem to me that that staff should be relatively small.

MR. SCHULTZ: It seems to me the area of choice is really this: If the F.A.O. gets going, should its purpose be essentially passive or active? To what extent should it be indirect and long-run in its impact and to what extent should it be more direct and immediate in the functions it undertakes? If the F.A.O. takes on functions that are associated with education, the getting of information, the gathering of statistics, there is no issue, and all are agreed that there are gains to be had from international division of labor in research. Dean Buchanan touched on that. There are many ways in which great savings can be made by planning researches in the biological field, taking advantage of the way resources are handled, for instance, in international regional laboratories. Certainly there is gain for many peoples in the extension of knowledge, disseminating what already is at hand in many centers in the world. It is slow, it is indirect, essentially a "passive" approach.

Next comes certain regulatory work in behalf of food and agriculture. It is a little less passive than is education, gathering of statistics, etc. Most individuals here go along and favor this type of activity. The real differences arise in the sphere of economic activity. It reflects the gap between Mr. Tolley and Mr. Fisher.

Without judging the merits of the respective positions, let me outline the choices. If you focused on commodity agreements with respect to fisheries and the depletion of natural resources that go with the way fishing beds are sometimes depleted, again there is agreement that fishing rights need to be covered by international agreements. When it comes to commodity agreements for wheat, coffee, sugar, etc., there is less agreement, certainly.

Take still another area. Mr. Tolley would favor the F.A.O.'s advising an international bank in its allocations of credit when those credits affect agricultural resources, so that those resources do not get out of line with international uses and divisions of labor. I do not want to press further into that area. Mr. Fisher would presumably say, "That is a bit dangerous; that is getting into a sphere not appropriate to the F.A.O." Mr. Tolley would say, "That isn't going far enough. We ought to go a good deal farther."

MR. FISHER: If the proposed International Development Bank which was discussed at Bretton Woods were to be set up, the F.A.O. should be perfectly free to make representations of any sort to that bank. Whether it would be wise for it to be directly implicated on the board of directors or anything of that sort is more open to dispute.

E. TWENTYMAN (British Food Mission): At Bretton Woods it was agreed by the conference that prepared the draft for the charter of the International Bank at the instance of the Interim Commission on Food and Agriculture, not only that the F.A.O. should nominate the agricultural representative on the Advisory Council of the bank but also that agricultural and food projects submitted to the bank in connection with applications for loans, should be referred to the F.A.O. and that the recommendations and views of the F.A.O. in regard to such projects should be considered by the bank before it took decisions in regard to the applications.

PART VI

CONSEQUENCES AND POLICY

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FOOD AND AGRICULTURE IN A DEVELOPING ECONOMY

By THEODORE W. SCHULTZ[1]

NEVER before in history has society been so near to having enough food for so many people. The developments during the war have made us aware of this new capacity to produce and to manage the food economy so that it may serve better the food needs of all people. New advances are at hand, ready to be realized, provided society is prepared to act and to take advantage of the gains from better production and consumption. But we are still far from prepared. Once relief needs have been met and granaries have been refilled, governments will be confronted, once again, with so-called agricultural "surpluses," since one thing is sure: farmers will stay in full production even when industry fails to do so and even after the demand for food and fiber shrinks and farm prices fall. The production of farm products will go ahead at a steady gait—ever so steady compared with the erratic performance of many other sectors of the economy.

The expansion in agricultural production attained during the war will, for the most part, be maintained. In the United States it is likely to be about a fourth larger than pre-war production; but the demand will contract far below wartime levels. Support prices, obviously, will not bring the two together; instead, by themselves they will worsen the disequilibrium. Nor will the subsidization of exports cover the difference. And the same verdict holds for acreage-allotment programs of the old A.A.A. type. Moreover, measures designed to supplement the consumption of families who otherwise would not receive adequate diets may not close this gap. Programs of this general type may well help in keeping farm prices somewhat higher than they otherwise would be; they might help in holding farm production in check a little, but, judging from past experience, it will be ever so little; and they may well provide some additional demand, but far from enough to employ fully and efficiently the labor and other resources engaged in agricultural production. Fewer barriers to world trade would help somewhat. Yet all of these measures are not likely to be sufficient to keep the rapidly growing output of farm products and the less rapidly growing consumption in equilibrium with each other, unless a large quantity of resources is transferred out of agriculture.

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[1] Professor of agricultural economics, University of Chicago.

PURPOSES[2]

It is becoming evident that there are fundamental forces reshaping the supply and demand of food in a developing economy that characterizes countries with populations of "Incipient Declining" and "Transitional Growth" types. The main thesis that emerges from this analysis may be put quite simply: The entire food and agricultural sectors of the economy in this and in other countries are subject to serious strains arising out of the *unequal rates of growth of the demand and supply of farm products*, with one in process of slowing down and the other being accelerated. This unequalness in growth is secular; at times it is hidden temporarily by war or by trade fluctuations. The forces causing this unequal growth already had their head prior to World War I; they moved on with glacial persistency during the interwar years; they certainly have not been checked by the events of World War II—instead, they have gained in momentum; and in all probability they will become even more important in their impact after the war. There is no little evidence to support the view that these forces have become altogether too powerful and persistent for the equilibrating mechanism of the economy; it does not appear to have the capacity to cope adequately with them, and serious disequilibria have been the result both within and between countries. Nor is it likely to do an acceptable job in reconciling these forces after the war, unless it is improved and fortified very substantially.

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[2] It should be borne in mind throughout that our attention here is focused at the postwar and not at the war or the transition, not at relief or rehabilitation, U.N.R.R.A., or Lend-Lease. We are dealing distinctly with the long run—the next two, three, five decades. Short-run fluctuations are not considered, thus the very important problem of income instability in agriculture, which is so closely associated with trade fluctuations, is not touched in this analysis, nor are other short-run developments in agriculture, associated with droughts, famines, fluctuations in yields, livestock cycles, and others that originate on the production side. Likewise we are concerned with general considerations and not specific problems in agriculture, such as the maladjustments in the cotton South, the American wheat problem, farm tenure, agricultural credit, or soil conservation. Then, too, we are examining certain slowly changing primary variables—they are essentially constants—as forces affecting the agricultural economy.

As to countries and population, the analysis deals with Dr. Notestein's "Type I, Incipient Declining," and "Type II, Transitional Growth," and not with his "Type III, High Growth Potential." The whole analysis is cast in terms of a developing economy, certainly not in terms of a stationary state as such. Finally, this essay does not consider alternative and appropriate policy. Instead, it is an attempt to isolate causes and to detect their consequences—circumstance that are appropriately the building blocks for policy-making. There is only an occasional aside as to policy implications.

A developing economy usually places strains and stresses upon the institutions and mechanisms that bear the burden of adapting and adjusting for advances in technology, improvements in the skills of people, accumulation of capital, changes in tastes, and changes in population. To approach the new equilibrium requires adaptation, recombination, and growth, and these, as a rule, do not occur easily and smoothly. Consequently, disequilibria occur in the structure of prices, in incomes, and in the capacity to produce and consume. In the case of farm products, as already indicated, the main effect has been an unequal rate of growth in supply and demand. The resulting maladjustments are, in one sense, a measure of the severity of the strain; in another sense, they indicate the extent to which the economic system fails to cope with the underlying forces.

With these general observations delineating the scope of this paper, let us turn to a classification of forces reshaping the food and agricultural parts of the economy.

DIFFERING RATES OF GROWTH

Three general types of situations arise. One type, easy to visualize, is that of equal rates of growth in the demand and supply of farm products. For example, if the demand during the course of a decade were to expand so that 20 per cent more farm products were purchased by consumers at the same relative price; and if during the same period the supply increased so that 20 per cent more were produced and sold by farmers at the same relative prices—then it might be said that the demand and supply had grown at the same rate. A development of this type would give rise neither to a farm problem, with too many resources in agriculture, nor to a food problem, with rising cost of living. Food consumption per head might be low or high, but it would not necessarily worsen. Relevant to this analysis, however, is the fact that the capacity of the economy to adjust, in order to maintain an equilibrium in the allocation of resources, would not be taxed.

The second type of development arises when there is unequal growth with the demand having a tendency to outdistance the supply. This is the classical formulation based on overpopulation and on a shortage of food-producing resources—historically a scarcity of land. These conditions are still one of the main causes of poverty in many parts of the world, certainly in India and China—in all of the countries Dr. Notestein has classified as "High Growth Potential." At the time of Malthus the British population was doubling itself in a half-century. Troubled Malthus put the main question of that day succinctly: Could the island produce enough extra food to feed this rapidly multiplying population? J. R. Hicks, in commenting upon the difference between the fates of England and of Ireland in avoiding the peril of a serious want of food observes: "As the problem appeared to the Malthusians, shortage of agricultural land was an insuperable obstacle; when once the population of any country had reached the point where shortage of land becomes acute, the people will be bound to suffer from poverty, poverty which could only be remedied by the population becoming smaller."[3] Under these circumstances the demand for food presses hard against the "niggardliness of nature." The implications of a Type II development to rent payments, to the cost of food, and to economic progress are well-known contributions of the Older Economists.

The third type of development arises when there is unequal growth, with the supply of food in the vanguard. Food becomes more abundant and cheaper and rent payments fall; the scarcity of farm land recedes; and the fear of overpopulation disappears. A farm problem arises, and in bad times it may readily turn into an agricultural crisis. The equilibrating mechanism is burdened by a transfer problem, namely, the very difficult task of transferring an excess supply of resources out of agriculture.

Contemporary experience is characterized by the third of these three types of developments. We shall next consider briefly the causes for Type III rates of growth in the demand and supply of farm products.

CAUSES FOR THE SMALL GROWTH OF DEMAND

The rate at which the demand for farm products expands in a developing economy depends, quite clearly, upon changes in population, income, and consumers' taste. (We exclude here changes in prices because they are a means—in fact, the primary one—for reconciling the various forces and counterforces.) A simple example, with an eye to the war period and the United States, will illustrate the interplay of the forces shaping the demand.

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[3] *The Social Framework* (London: Oxford University Press, 1942), pp. 55-56.

For this example let us assume: (1) a 5 per cent increase in population, (2) a 40 per cent increase in income per head, and (3) an income elasticity for farm products of 0.25.[4] Had these changes occurred under peacetime conditions, with all of the population in civilian pursuits and with goods and services available to civilians, what effect would they have had upon the demand for farm products? The demand presumably would have increased 5 per cent on account of population and 10 per cent[5] as a result of changes in income, an aggregate growth of 15 per cent. If, meanwhile, the output of farm products had expanded 15 per cent, the additional production would have cleared the markets at the same relative prices that prevailed at the beginning of the period. The production of farm products, however, has increased about 25 per cent; thus, to equilibrate the supply and demand under the conditions given in the example, the price of farm products would have to drop, below pre-war levels relative to other prices, unless a much larger export demand developed or unless other measures were taken to curtail production and expand consumption.[6]

Before going further it may be helpful to outline briefly the main factors playing on demand.

POPULATION

The nightmare of overpopulation that oppressed Malthus and his contemporaries no longer troubles our minds. The rate of population growth in the United States has been dropping rapidly, with an expected increase of about 5 per cent during the decade from 1950 to 1960.[7] Population changes of Europe are following a course similar to our own with a projected increase, exclusive of the U.S.S.R., of

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[4] There is the further assumption that the production and consumption of farm products were in equilibrium at the beginning of the period.

[5] 10.5, to be exact.

[6] It should be stressed that these deductions are not predictions. They are the necessary consequences of the conditions that have been assumed in the illustrative example, other factors remaining constant.

[7] National Resources Committee, *The Problem of a Changing Population* (May, 1938). Thompson and Whelpton estimate the population of the United States, based on the assumption (Table II, p. 24) of medium fertility and mortality and 100,000 net immigration per year, as increasing 5.5 per cent during the decade of 1950–60).

1.5 per cent for the decade 1950–60 and of 12 per cent for the U.S.S.R.[8] Extra demand for food from further increases in population, within the orbit of the economy that makes direct claims upon the agriculture of most Western countries, is already very small and may soon disappear altogether.

This is not all. The net reproduction rates in the industrial-urban areas are decidedly lower than those in rural and farming areas. The result is that most of the population increase that still occurs has a perverse effect on the particular problem under consideration, in that, while it adds somewhat to the demand for farm products, it also further burdens agriculture by adding very considerably to the excess supply of resources in agriculture. Most of the increase in population to be expected during the next two or three decades, as far as the food and agricultural economy is concerned, is certainly not an unmixed blessing because of the peculiar vulnerability of agriculture to overpopulation relative to the economic opportunities in prospect in growing food, fiber, and other farm products.

INCOME

With the return of prosperity, induced by the war, optimism is booming. One finds a widespread belief with regard to the postwar period that the wartime gains in income will be maintained and that the additional purchasing power will, among other things, provide an adequate market for farm products. We have already intimated that this optimism may not be well founded.

In outlining the course of income, however, we are on a rather different footing from that of projecting changes in population. Incomes are more erratic and less determined by slowly changing forces than is population. Looking back, it is plain that the United States enjoyed a most remarkable rise in incomes in the two decades immediately preceding World War I. During the years between the two wars, however, incomes fluctuated widely without any appreciable secular gain. Sweden is a notable exception. Since 1939 the rise in income has been very considerable in most of the United Nations; the conservative estimates of Kuznets put that of the United States at about 40 per cent per head. If this gain is held during and after the transition, which certainly is not a certainty, it still will not increase the demand for farm products enough to absorb the extra output of agriculture at the relative prices that prevailed at the beginning of the war.[9] This inference, however, turns on how people spend their income as they become richer.

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[8] Frank W. Notestein and Associates, *Future Population of Europe and the Soviet Union* (New York, 1944), Tables 1 and 2.

INCOME ELASTICITY

The income elasticity of farm products is low and falling. It is much lower than is usually supposed. It is quite misleading to take the elasticity of expenditures for food with respect to income and assume that this is the income elasticity of farm products. Food as it is purchased by consumers has had many services added. Foods are a combination of farm products and nonfarm services. These nonfarm services do not create any additional demand for farm products and thus do not represent claims for agricultural resources. As consumers become richer, they increase their expenditures for nonfarm services more than for the farm inputs involved in producing food. For these and other reasons one would expect the income elasticity for farm products to be less than that of the expenditures for food. The best estimates that I have been able to make indicate that the elasticity of income of farm products falls somewhere between 0.2 and 0.3. I am prone to take the mid-point, namely, 0.25. With this elasticity it follows that a 40 per cent rise in income per head would create an increase of only 10 per cent in the demand for farm products, with relative prices and other factors remaining constant.

NUTRITION

Advances in applied nutrition make themselves felt in the economic sphere in two significant ways: (1) by changing the taste of consumers and (2) by increasing the efficiency of food. The first of these may either increase or decrease the demand for food; the second, however, definitely points to a curtailment. But much will depend on how the advances in knowledge in this sphere are put to use. Thus it is not in any sense predetermined what effects nutrition *as knowledge* and *as a movement* will have on the demand for farm products.

It is quite conceivable that people as consumers may be induced to place a higher value on food relative to other goods and services and thus, even with incomes remaining constant, they would choose to spend more of their incomes for food. Such changes in the values underlying consumers' choices are exceedingly fundamental, and they are not likely to occur rapidly. Then, too, many factors are gradually reshaping consumers' choices, of which the advance in nutrition is merely one. The common belief is that better nutrition will induce people to include more of the expensive foods in their diets, which are usually costlier in terms of land, labor, and other resources required to produce them. Much of the "pushing" that has been going on for better nutrition during the interwar years has been of this nature. It has fitted in well with the prevailing food habits and tastes of Western people, and it has also supported the "desire" to enlarge the effective demand for farm products. We shall show in a moment, however, that the more basic effect over the long pull is likely to be in the opposite direction.

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[9] Farm prices during the years 1937–39 were not viewed as "favorable"; in 1937 the so-called parity ratio was 91; in 1938, 76; in 1939, 76; and in 1940 still only 79. Even at these prices the C.C.C. was accumulating stocks rapidly.

Public measures may also be employed to improve diets. These measures are of two general types—those that are indirect in their effect, for instance, lessening the inequality of incomes among families, and those measures that employ direct means to help families who are not acquiring an adequate diet. The income elasticity of food is somewhat more elastic for families in the lower-income brackets; consequently, a more equal distribution of income would increase the demand. Progress of this kind, however, is likely to be exceedingly slow and gradual, and thus, even under the most favorable circumstances, it is not likely to add appreciably to the demand for farm products in the near future.

The primary-demand effect of better nutrition, which has not been emphasized sufficiently, is its contribution to the efficiency of food by discovering many ways for improving diets at less and less cost—cost in terms of the land, labor, and other resources it takes to produce food. In this, however, much will depend upon the orientation of new researches and upon the educational programs and public measures used to improve diets. The extra efforts to economize on resources during the war have given some insight as to what may be expected. In this respect advances in nutrition represent merely one kind of technological progress, one that enlarges our range and capacity for satisfactions in terms of the food products available to us and that shows us how to acquire better diets at lower cost. As this development takes place it will not, as is commonly supposed, create additional demand for food; on the contrary, advances in nutrition are likely to save on food-producing resources and thus add further to the abundance of the supply of food.

CAUSES FOR THE ACCELERATED GROWTH OF SUPPLY

The rate at which the supply of farm products expands in a developing economy depends upon advances in technology, improvements in the skill of farm people, the rate of investment or disinvestment in agriculture, developments in land resources, and changes in producer preferences. (Here, again, we do not include changes in prices, since they are the primary means for equilibrating the various forces and counterforces affecting the supply.) May we note, however, that farm prices work best in bringing about shifts in the use of resources within agriculture and in channelizing farm products into the market, but do not perform satisfactorily in transferring labor resources out of farming unless there has been a long period of industrial expansion with a brisk demand for labor outside of agriculture.

The merest kind of an outline of the nature of the forces affecting the supply of farm products must suffice. Of the several forces, the primary ones are technology and the well of labor that is constantly overflowing in agriculture.

TECHNOLOGY

Difficult as it is for us to gain perspective with regard to our own period, there is a growing realization that we are in the midst of a revolution in agricultural production. A mighty forward surge in technology is on, which, instead of having spent itself, is still in its early stages. It is likely to take decades for the known improvements in farm practices and techniques to be diffused and transmitted from the more advanced to the more backward farming areas, for example, from the wheat and corn belts to the Appalachians and the South; and from countries that are favored in their technology to those employing primitive and inefficient crops and livestock and tools and machinery practices and techniques. To illustrate: we started the war with slightly more than six million farms in the United States. Within a few years agricultural production has been increased fully one-fourth, while the number of farms has shrunk, perhaps one-tenth, the farm population has declined one-sixth, and the labor supply has lost much in quality although not so greatly in quantity. It has been estimated that by 1950 four million of our farms may readily produce a third more than did the entire six million prior to the war.

The new practices and techniques in agriculture have two salient features: (1) they are largely labor-saving in their effect, since they reduce the marginal productivity of labor in agriculture and in this sense replace labor or make it more abundant and cheaper; and (2) they increase, on the other hand, the marginal productivity of capital; new capital forms, like power-driven machinery and equipment, hybrid seeds, and new breeds of animals, have become more productive. Returns from these inputs are accordingly high, in spite of the general excess of resources in agriculture. With the technological changes that are in progress, along with widespread capital rationing in farming, which is both self-induced and imposed, agriculture is starving for new capital. The marginal efficiency of new capital in much of the agriculture of the world is probably exceedingly high compared to going rates of interest, with very liberal allowances for risk and uncertainty. The flow of new capital in is blocked for the most part by the failure of enough labor resources to flow out.

LABOR FORCE

Enough has been said under population changes to indicate that the net reproduction rates of farm people are such as greatly to oversupply agriculture with labor resources, 60 per cent more than is required to replace the present farm population with no allowance for the very considerable overpopulation that has come to prevail.

MAJOR CONSEQUENCES

We are now ready to turn to certain major consequences of a developing economy of the type that characterizes this stage of our history. In describing the essential features of this development, with respect to food and agriculture, we have left aside wars and business fluctuations, and we have not dealt with the postwar transition but, throughout, have focused upon the long pull, the slowly moving, persistent, secular forces which were at work in an important capacity even long before World War I and which, we have every reason to believe, will continue to operate with even added efficacy during the next two or three and more decades after the war. The forces affecting the growth of the demand for farm products (certainly of food) are slowing down; in the first place, the population that buys the bulk of the farm products produced in Western countries is increasing at a slower rate than formerly, with the likelihood in prospect that it will stop doing so altogether; and, in the second place, people, as they become richer, spend proportionately less of their income for consumer goods from which farm products derive their demand. In a real sense the new knowledge about nutrition is a new element in shaping the demand. Contrary to the common belief, however, it is likely, as the years go on, to lessen the demand for food by increasing its efficiency. Forces affecting the growth of the supply of farm products, meanwhile, are becoming stronger. New and better farm practices and techniques are making rapid strides; and, while they call for more capital and more skill, they unmistakably call for fewer people in agriculture. But the net reproduction rate of the farm population is the highest of any major occupational group, far above what is required to supply agricultural needs.

The primary consequences of these developments to food and agriculture become fairly obvious. They may be put as follows:

1. Unless the equilibrating mechanism has the capacity constantly to transfer a very considerable quantity of resources out of agriculture, we would expect a chronic disequilibrium adverse to agriculture to occur and to persist, except during wars and for a short period during business booms and also for a while whenever governments accumulate large inventories of farm products.

2. We would expect agriculture to be burdened constantly with an excess supply of labor even during periods of business expansion and of brisk job opportunities in nonagricultural industries. The burden of equilibrating the excess supply of resources in agriculture falls primarily on the labor force simply because the improvements in farm technology are largely labor-saving in their effects and, therefore, reduce the marginal productivity of labor. Furthermore, labor constitutes the bulk of the resources employed in agriculture and, in addition, workers are transferable. To equate the forces and counterforces affecting the supply and demand for farm products, what is constantly required is a redistribution of the labor force with relatively fewer workers engaged in agriculture as the economy develops. Slowly, but always belatedly, this is happening. The statistics on this point are very conclusive. The proportion of the labor force occupied in agriculture has been declining, not only in the older industrial countries of Europe, but also in the newer, more largely agricultural countries, and also in parts of the Orient. The universality of this decline is striking. To illustrate: since the turn of the century the proportion of the working population engaged in agriculture in the United States has dropped from about 37 to 15 per cent;

in Canada, from 40 to 22 per cent; in Sweden, from 50 to 36 per cent, by 1930; in Japan it also has dropped, from 72 per cent in 1891 to less than 50 in the thirties. Yet in no country, to my knowledge, has the transfer of labor out of agriculture occurred soon enough and in sufficient numbers to put the marginal productivity of labor in agriculture on a par with that of labor in industry. Even the extraordinary developments that have occurred as we have mobilized for World War II, with farm prices doubling and net farm incomes rising even faster and with a net reduction in the farm population of about five million—all these changes favorable to agriculture have not been sufficient to make industrial and farm incomes per worker comparable, judging by the migration which is still continuing out of agriculture and from the various controls that have been instituted to hold workers on farms.

3. We would expect the migration out of agriculture to increase as farm prices fell, surely as they fell relative to other product prices, and to slow down, even if it did not stop altogether, as farm prices rose. Here, however, our expectations have not been borne out by experience, certainly not by the events of the interwar period. As farm prices fell, the net migration of people from farms declined, and the converse was true as farm prices rose. This interplay of prices and migration is indeed contrary to assumptions about economic behavior. The explanation seems to be that both prices and migration have been determined by some more general forces, namely, the forces that created the business boom of the twenties, the great depression, and the remarkable wartime expansion. If this is true, it follows that the recovery and expansion from 1921 to 1929, from 1933 to 1937, and again from 1938 to 1944 did not go far enough to make the resulting rise in farm prices a factor in checking the transfer of labor resources out of agriculture, because the more farm prices rose, relative to other prices, the larger the net migration from farms. The mechanism of relative prices was, indeed, superseded by forces other than price; the transfer of labor out of agriculture occurred, not in response to changes in relative prices, but in spite of such changes as did occur. The availability or nonavailability of jobs has been the critical detriment. Jobs in nonfarm pursuits have taken farm people off farms despite rising farm prices. We simply do not know at what point higher farm prices would stop the transfer of labor out of agriculture when there are jobs available in industry. This suggests the following working hypothesis—the mechanism of

relative prices is not effective in inducing a redistribution of the labor force, that is, transferring the excess supply out of agriculture, unless there exists a better distribution and fuller use of resources than prevailed from 1920 to 1943.

4. We would expect food to be cheaper on account of the chronic disequilibrium caused by the differing rates of growth of the demand and supply of food than it would be if the excess supply of labor in agriculture were a minimum. Obviously, merely raising the price of food by governmental action does not remedy this situation, since it does not get at the underlying causes.

5. The last, and in many respects the most important, of the several major consequences affects international relations. International trade extends and enlarges the capacity of the economy to equilibrate the forces affecting the supply and demand of farm products. It is this feature of international trade which is commonly stressed by students of the field. But what is not recognized, at least what is left unsaid, is the fact that international trade does not and cannot keep incomes per head from declining in certain agricultural countries (nearly always with very low nutrition) in a developing economy of the type we have described in this paper. This difficulty arises from the fact that some countries are not in a position to transfer labor resources out of agriculture. The nature of this difficulty can best be seen by stating the conditions that create it.[10] Any trading country which (*a*) is primarily agricultural, (*b*) is dependent on farm products for its exports, (*c*) is producing farm products, the supply of which is affected by the introduction of labor-saving farm technology, and (*d*) does not have the capacity to industrialize and thus absorb the excess supply of labor developing in agriculture—such a trading country is likely to have its per capita income reduced by the forces reshaping the supply and demand of farm products. There is no remedy for this difficulty in trade per se. Trade offers other types of gains. The defect here is rooted in the nature of the resources, and it is caused by the underlying forces already analyzed. The effects on incomes in certain trading countries are decidedly adverse unless people migrate to other countries. It is necessary to transfer labor resources from a country thus situated to countries which have the resources required for industrialization.

Of course, this difficulty does not arise for a country with a large industrial potential, for it can correct the resulting disequilibrium by internal migration. In this respect the United States is very fortunate, although we have not kept our house in order when we acknowledge what is happening in the South. Russia is also fortunate; so are such industrial countries of western Europe as Great Britain, Germany, Belgium, and others. Some of the newer countries are also favorably situated, such as Canada, Australia, Brazil, and, to a less extent, Argentina. But what about Cuba, Old Poland, and the Danubian countries, for example? Take the Danubian area. The opportunities to industrialize have been all too restricted. Additional capital would facilitate some industrialization. Most of the people are engaged in farming, notwithstanding that advances in labor-saving farm technology affecting the main products of these countries have reduced labor requirements by a third, perhaps even by one-half. Where is this excess supply of labor in agriculture to go? Freer trade will give these producers access to the world markets and therein lies a gain, but trade does not and cannot keep the incomes per worker of such countries from going down, which is one of the significant consequences of the changing structure of demand as people become richer and of the advances in labor-saving technology that is going forward in agriculture.

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[10] See the writer's article, "Two Conditions Necessary for Economic Progress in Agriculture," *Canadian Journal of Economics and Political Science*, X, No. 3 (August, 1944), 305–6.

With further industrialization in countries of the Incipient Decline type, we may expect trading countries in this group to increase their imports of food somewhat. Further industrialization in countries whose population is of the Transitional Growth type is likely to result in a rapid growth in the demand for food because of a considerable increase in population and, further, because the income elasticity with respect to food in such countries is high. Russia certainly is one of these countries. Brazil also belongs in this category. The growth of the demand within such countries may curtail, even stop altogether, any exports of food; but we are not likely to see such countries importing any considerable amount of food. Countries that are unable to industrialize, unless the people from such countries are permitted to migrate to other countries, are caught in an "income squeeze" of the type considered above. The Danubian countries, Cuba, Old Poland, and many others are in this category.

The industrialization of backward countries may substantially reduce the poverty of many people; but it is a mistake to believe that this industrialization will give rise to additional demands for farm products produced in the major food-exporting countries; the additional demand that will be forthcoming will come singularly and uniquely, but only from countries of the Incipient Decline type, largely from countries of northern Europe where the additional demand for food will come as a result of improvements in income and not from further considerable increases in population.

Finally, it is necessary to state again that the analysis set forth in this paper is valid in terms of the long run. In it wars and trade fluctuations have been left aside. It is applicable to countries of two demographic types, as Dr. Notestein classifies them—Type I, Incipient Decline, and Type II, Transitional Growth, and it is in terms of the developing economy, economic progress, and rising incomes. Throughout, the analysis has been focused upon essential causes and their consequences and not upon problems of policy. The major consequences point to a continuing chronic disequilibrium affecting agriculture, which arises primarily from the excess supply of labor that accumulates and burdens agriculture. The mechanism of relative prices has had severe shortcomings in transferring excess supplies of labor out of agriculture when we look at the experience of 1920–43. The disequilibrium gives rise to an artificial cheapness of food. In the international field, trading countries that are unable to industrialize find themselves in a serious income squeeze which can be remedied only by migration. Trading countries that have been backward in their technology and that have very limited amounts of capital at their disposal, but which have the potentialities for industrialization, may well experience a very considerable increase in the demand for food. But to satisfy such additional demand for food, production is likely to be increased within the country instead of importing it. Trading countries with an advanced technology and with industrialized and urbanized communities may well experience further real rises in income and, as a consequence, import more food. But for most countries in this latter group population increases in prospect are very small, the income elasticity for food is already very low.

BASIC ELEMENTS OF AN INTERNATIONAL FOOD POLICY

By KARL BRANDT[1]

SEVERAL preliminary steps are necessary in laying out the basic elements of an international food policy. First, we must agree on the structural design and the fundamental principles upon which the good society rests. After such agreement, we shall have limited the available alternative courses of policy to such an extent that it will be easier to agree on the appropriate measures by which these policies can be executed.

Several major assumptions deserve special emphasis, since they implicitly exclude a large variety of technical means applicable to details: (1) In the coming peace the Western nations will adhere to principles of tolerance toward people of different convictions and will show respect for minorities; (2) they will reaffirm their respect for the life and liberty of the individual; (3) they will continue to uphold or reaffirm their belief in the family as the basic cell of society and give it more effective protection and anchorage; (4) they will uphold the civil liberties. It is also assumed that these nations realize that productive resources can best be utilized when private initiative furnishes the motive-power.

Perhaps the most central ideological difference between the now victorious United Nations and the defeated Axis powers lies in our belief that, as children of God, human beings have the divine spark which enables them to respond to education and to develop their innate potential ability to choose between good and evil and eventually to interpret intelligently their own self-interest, irrespective of the color of their skin or hair, race, linguistic adherence, or other group traits.

All these tenets are cornerstones of modern constitutional government, which is based on the conviction of the justice of an evolutionary society which must offer equal opportunity and rejects the concept of a static social hierarchy. These tenets exclude a great many short-cut patterns for domestic and international food policies, no matter how tempting those solutions may be, technically or administratively.

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THE GOAL OF AN INTERNATIONAL FOOD POLICY

The ultimate goal of an international food policy can be formulated as follows: All human beings on this earth at all times should be well enough supplied with food to have their physical well-being, their ability to work, and their life-span free from the menaces of undernutrition and malnutrition. In particular, the most vulnerable consumer groups, such as pregnant and nursing women, children, and convalescents, should be well and safely provided with food.

Those who produce, handle, and treat the food on its way from producer to consumer should be able to contribute their services to the world's food economy under circumstances which do not deprive them of their liberties, which give them a fair opportunity to enjoy satisfactory working and living conditions, and which offer them a reasonable degree of stability and security.

To everyone who has some sense of the hard realities of this world, it is all too obvious that this goal is an ideal worth the sweat and the toil of the nations, but it is far from easy to attain, if, indeed, it ever can be fully realized. Moreover, little progress toward it will be made unless we realize how many obstacles must be overcome and how difficult it is to advance at all because of the existing limitations upon an all-out attack. Progress will—in spite of modern science—be made gradually, the hard way, by inches and not in jumps of miles.

One of the most common errors in our thinking about national and international food policies is the tacit assumption that individuals, and nations as well, are able or willing to give absolute priority to the solution of the problem of food and nutrition. This assumption is utopian and serves only to confuse the issues. Man does not live by food alone, nor can he even temporarily confine his economic effort to solving the food problem exclusively or even primarily, nor would he wish to do so if he could. To make sacrifices in physical comfort, health, and even life for the sake of spiritual and moral values is one of man's noblest privileges. In times of peace, individuals as well as nations must compromise in the allocation of their economic resources to a great many pursuits and the satisfaction of various needs and desires. Some nations have tightened their belts for decades in order to improve education and productive capacity first. Russia and Japan are two examples. Nations must compromise in allocating their energies because these resources are scarce compared with the aggregate total of the needs of the human race, and immeasurably much more scarce compared with the aggregate of human wants, private and social.

This very fact requires that in the production, processing, and distribution of food a maximum satisfaction be accomplished with a minimum of economic effort. The same principle of economy should apply, moreover, to the utilization and consumption of food. Efficiency and the effort to lower costs should prevail in every phase of the food economy. Food should be produced where it can be grown at least expense. Food should be wasted neither by faulty composition of diets nor by careless preparation, avoidable spoilage, or improper eating habits. Finally, thrift concerning food means that people and nations must seek a balanced diet on an economic level which is in harmony with their general economic status.

PRIVATE INITIATIVE IN FOOD PRODUCTION AND CONSUMPTION

Since Russia's dramatic rediscovery and emphatic reaffirmation of the classical economic axiom that there is no substitute for the creative force of private initiative and that economic policy must offer it strong incentive, it can again universally be taken for granted that this motive-power must be utilized in all fields of the food economy—in production, processing, distribution, and consumption. By 1935 Russia had reached the point where peacetime rationing was abandoned and private initiative as to consumption restored because it gave an effective incentive to more efficient production. If for no other reason, this decision must be universally applied because private initiative is compatible with political freedom, while its fettering inevitably requires methods of total political control and regimentation. But economy and efficiency in the use of food must not be attained at the price of sacrificing man's right to choose what he wants to eat and to leave what he doesn't. If we do not want to delegate the decision of who shall cease to be a producer of certain goods to the government, we have no other choice than to choose policies which create the gravitation which makes the individuals move in the right direction.

Policies based on the use of private initiative applied to food preparation and consumption call for the belief in man's native intelligence, his ability to learn, to adjust his habits, and to make decisions about what is good for his health; but they also call for the opportunity to earn the income necessary to purchase needs and for the ability to manage food budgets so as to make possible the composition of workable diets at chosen levels of expenditure. We cannot defend general suffrage, think in terms of sovereign people, and in the same breath advocate policies which make the government responsible for selecting for the people what they shall eat and in procuring allotments for each of them.

There is remarkable evidence that with general economic progress and increasing production of man's work and thus increasing real income, people exercise those faculties and make great strides in the general direction of the goal outlined. In our understandable enthusiasm about the progress of the scientific disciplines dealing with nutrition and in various fields of medicine, we are easily tempted to forget the revolutionary improvement in national diets which has accompanied the rise of the modern industrial era. In view of the shortage of sufficient documentary evidence about the status of nutrition four or five generations ago, we cannot accurately measure the full degree of improvement. Even today our knowledge about national and group diets is rudimentary, measured by what we really want to know accurately. However, what we *do* know is enough for us to see that, as the real income of the people increased, diets were adjusted in general in the right direction, and health, stature, and life-span improved as a result. The improvements came about in spite of the fact that the people always used only a fraction of the income increment for their food budget. By the process of adjustments under a competitive flexible price economy, which so aptly has been called the daily plebiscite (namely, by dollars and cents spent), consumers have directed the allocation of economic effort in agriculture and fisheries toward the expansion of the preferred products, such as animal products, fruits, and vegetables. Until recent decades, there was little specific nutritional education or research involved in this almost glacial shift to a more and more advanced diet.

What is perhaps even more important, through the advancement of ocean and land transportation, of storage and preservation, and the greater abundance of capital, the economically advanced countries have succeeded, by means of public policies co-ordinated with well-organized and resourceful private enterprise, in developing agencies active in the food market to such a functional performance, and enlarged the storage capacity and mobility of stocks to such an extent, that for these nations the eternal scourge of famine due to crop failure has disappeared. For a major part of the human race this stage has not yet been reached, because it has not participated in economic progress. The chief cause of hunger and malnutrition is poverty.

In their sum total, these accomplishments under the industrial revolution far outweigh the change thus far caused by the application of progress in the science of nutrition. The decentralization of effort and initiative has brought about these accomplishments. This fact deserves careful evaluation in any effort to draft the elements of an international food policy. It leads us straight into the controversial issue of the extent to which a policy aiming at progress in food and nutrition can safely count on the processes of education and private initiative, and how far it must rely on direct governmental action and intervention.

PUBLIC PLANNING COMPATIBLE WITH PRIVATE INITIATIVE

There can be little debate about the fact that satisfactory solutions of the food problem—even with the maximum of private initiative and action—depend on a well-functioning society with law and order, a high use of productive resources, and a fair distribution of employment and income. One of the keys to a workable strategy concerning food as well as agriculture is that the most effective economic leverage which the public can exert must operate through other sectors of the economy. An optimum rate of employment and income in the industrial and commercial sectors is the primary condition for setting in motion and keeping alive the great dietary changes which a diminution of poverty has brought about in every country in the world in which the people were permitted to spend the improved income in accordance with their preferences.

Not only are public planning and governmental action compatible with private initiative, but they must provide a legal and administrative framework which guarantees the proper functioning of the latter. Public planning can assume proportions, or choose methods, which not only distort or thwart the free action of individuals or groups but centralize the origin of will power and thereby violate the moral principles upon which political democracy and constitutional government in general rest.

Public services for the best education and information of farmers, the food trade, and the consumers and planning for more accurate adjustments of production and consumption to the necessities of the market constitute one type of planning. The compulsory curtailment or expansion of the production or processing of some types of food, peacetime rationing, or subsidized consumption of food constitute another. The significant difference between the two types is the position which each gives the individual and the state. The ultimate measuring rod for the value of any public policy of government controls or intervention must be the degree of freedom of action for private initiative and free enterprise it manages to combine with its other aims.

For clarifying thought on this subject, an article by Marion Clawson entitled "Our Postwar Consumption of Food" in the summer, 1944, issue of the *Antioch Review*, is very useful. The author argues that subsidized food consumption is necessary because "no probable level and distribution of national income in the postwar period will provide all segments of our population with incomes out of which they will spend enough money to provide a minimum adequate diet. . . . while our agricultural plant is capable of producing sufficient food for a minimum adequate diet for all, and even superior diets for a majority of people."

This author does not claim that the people cannot or will not have higher spendable incomes to improve their diet but takes it for granted that out of their free will too many of them are not going to spend intelligently for food and the right kind of food and that therefore the government must help them to buy and consume what it considers a minimum diet by giving them additional food free of charge. This, of course, can be done. As such, it is an administrative matter, involving some special distributive techniques and budgetary questions. Competent administration will lead to some dietary improvements for low-income groups.

Other ideas entertained by public administrators contemplate the maintenance of rationing in peacetime, for the purpose of changing the people's diet by the power of point values. This is another version of the same ideology as that of subsidized consumption.

We may safely expect after this war a deluge of ideas, plans, and patent solutions, all of which begin with vast programs of government action. The war has tremendously expanded the domain of the state-controlled planned economy, and the vast and powerful bureaucracy behind it has a natural tendency to perpetuate itself and to think chiefly in terms of what state planning can do.

The appalling feature in this sort of approach is the tacit assumption that there are no alternative courses of policy, as well as the light-hearted acceptance of methods which are a part of a philosophy antagonistic to true democracy. It is suggested that, even if all the people have much better opportunities for employment and better incomes than they now have, they will by no means spend intelligently on food and the right kind of food but will give priority in their budgets to entertainment and a great many other desires. A policy built on this state of affairs may remedy the symptom of bad nutrition but would miss the opportunity to remedy the cause, which is a deficiency of knowledge and ability on the part of the people to manage their own affairs intelligently. Such an approach unwittingly belongs to a totalitarian philosophy, which relies on dealing with people as they are, disregarding the extent to which they can be developed.

The first task should be to put a great positive public effort into education about nutrition and food and health rather than to outsmart people and make them eat what they do not consider worth buying. If we place so little trust in the ability of people to learn how to manage their most basic personal affairs, why do we not apply the short-cut remedy of giving them, by direct public action, the proper clothing and shelter, too? Why should we try to see to it only that people get, free of charge, more food of certain types decreed by experts as necessary and not prevent also the overconsumption of food, including beverages, by many people, who thereby undermine their health and curtail their lives? It is a distorted goal for a good society to sacrifice great moral and political values for the sake merely of keeping the human animal physically fit. Subsidized food consumption may be the least harmful way of disposing of accumulated food surpluses. As the *major* part of our strategy under a constructive food policy, it is a mistake.

This critical view about subsidized consumption does not exclude the possibility of using the distribution of some types of food at reduced prices or free of charge at public expense as a minor subsidiary element in a sound food policy and as an educational rather than a curative device. Free school lunches are a worth-while experiment. No one will question, though, that adequate feeding of all children at home at private expense is preferable to subsidized feeding by the public. If such public feeding should lead to a lessening of private effort in the homes and a gradual shifting of feeding from the home to the public school, great harm would be done to the basic cell of any good society—the family. In trying to remedy the sad situation in which some families are found delinquent, one must not choose methods which may make them all delinquent. In fact, there is ample room for the fullest co-operation between the parents and the school in matters of better nutrition without shifting the responsibility for the actual feeding. The controversy is not about the end, but about the means of reaching it.

To secure a consumption of food above minimum requirements for good health and physical performance requires in any case the intelligent and informed action of a great many individuals and groups—those who process, those who prepare, and those who actually eat the food. Ignorance, incompetence, and misguided self-interest concerning health and nutrition on the part of these people can at any time completely invalidate any direct public measures toward dietary improvement. To equip the individual with better nutritional understanding and skill and to develop in him sound habits must therefore be the alpha and omega of any food policy—state, national, or international, in the United States as well as in Poland, India, or China.

The public can do a great deal to set better rules for the game of a free economy by which it can be played in a way which improves nutrition and health. We can either pass laws with minimum requirements for adequate facilities for in-plant feeding in industrial enterprises, or we can charge public agencies with the duty of co-operating with industries toward that end. Again, it should not be the government's business to feed the workers.

The domestic food policies of nations had to be discussed because in the future, as in the past, the nations will have the responsibility of organizing the food economy for the people of the world, and the people will have to earn their food and pay for it, if they do not produce it themselves. There will be no supergovernment of the world which will assume responsibility for people's food. The world will still function through the medium of sovereign nations. Fortunately, there are very narrow limits to economic coercion even with reference to the vanquished, except for a short period. Since nations live at different stages of economic development, of which national diets are only one factor, and since they each have very different combinations of food-production resources, it is inevitable that in the future great differences in the type, composition, and economic level of national diets will and must persist. These differences, however, in no way preclude the possibility of lifting all of them above the medical danger line. It would be absurd to build an international food policy around the Anglo-American type of diet as the desirable standard. National diets may contain no cow's milk, beef, or orange juice and still be well-balanced diets. To suggest a rapid change for the undeveloped countries from a predominantly cereal diet to a diet with more animal products is contrary to all economic necessities.

THE NEED FOR INTERNATIONAL COLLABORATION

The confinement of nations to their national boundaries and their resources and the extreme limitations built to international migration make it so much the more obligatory to create sufficient leeway for intellectual and economic co-operation between nations. All of them, even the most advanced, have a very deficient knowledge of the world's food economy and the food and nutritional situation in many countries. They are still less informed concerning the experiences various countries have had with certain policies. By continuous conference, co-operative research, pooling of experiences, and mutual aid in consultation about the more appropriate food policies, international action can go a long way toward the ultimate goal. Food, nutrition, and health are all ideal subjects for international co-operation per se. The nature and extent of malnutrition in a nation can best be analyzed with the critical assistance of experts from other countries. The organization of public and private research about the most-needed and most-feasible improvements can also benefit greatly from an international pooling of experience. The same can be said with reference to the establishment of nutritional goals and of research and education on the best contribution that domestic agriculture can make toward such goals.

Beyond intellectual co-operation, all nations must have a keen interest in shaping international policies that enable those among them who produce exportable food surpluses to sell them and those who must import to buy them. This is just as much a necessity for those with an excess capacity for low-priced food production as it is for the overpopulated ones with a shortage of fertile land.

The attainment of tangible results in an international food policy still requires that the consumer should, by his sovereign act of buying food, issue the order for production through the medium of price and at the same time obey the order of price in his own dispositions. Even without nutritional education, the world's people have known fairly well what they would like to eat. High tariffs, import taxes, and import monopoly levies distort the price mechanism. In spite of our progress in the science of nutrition, the basic economic problem is still the same as it was before the discovery of the vitamins, the allergies, and the greater complexities of metabolism.

If there is to be an era of greater stability in foreign relations and a less frequent recurrence of military adventures and aggression, economic intercourse between nations must be developed to the utmost. Freedom of access to food from the world's great surplus areas and freedom from need of food are nothing but empty phrases unless they are made workable by opening the gates of the wealthier nations to a prosperous foreign trade. If the Belgians, the Swiss, the Norwegians, the Italians, and the Germans, to name only a few apart from the British, are to be able to make accessible to their people a diet which lies sufficiently above the danger mark to insure health, they must be permitted to acquire the means of paying for foreign food purchases by exporting whatever goods they can produce in better quality, at more appropriate seasons, or at lower prices than others, or by rendering their services abroad.

The main obstacle to the introduction of such an international exchange of food within the world economy lies in the economic nationalism and protectionism which are so deeply ingrained in the history of America as well as that of other nations. The greatest creditor nation's unwillingness to receive payment in kind has contributed its substantial share to the conditions which culminated in the present catastrophe in international affairs. The greatest contribution to the future peace and toward the goal of freedom from shortage of food for all nations which the United States can possibly make is the lowering of tariffs and the extension of long-term capital loans to other nations. Freer trade must give the agrarian nations the opportunity gradually to industrialize and open for the industrial nations foreign markets for their goods so that they may purchase food where it can be produced at minimum cost. International food policy, therefore, lies not in an imaginary neutral realm of global blueprints. It emerges essentially from the sum total of national policies. A constructive international food policy must begin at home, nowhere more than among the great powers.

It is to be foreseen that shortly after this war this world will again face the problem of several countries with a capacity to produce food and fibers that exceeds the effective demand of the importing countries. The war has stimulated further technological progress for agricultural production. New machines and labor-saving devices, new and more productive varieties of plants, more advanced methods of animal husbandry, will be applied on a large scale during the immediate postwar period. The war has led also to the accumulation of large reserve stocks by some of the belligerents.

It takes no great amount of imagination to foresee that when the brief relief period—which may still be interspersed with scarcities—comes to an end, this situation will lead to vast surpluses and a deflationary pressure on the prices of these products. For the sake of getting the process of violent price decline under some sort of control and averting the dreaded consequences to agriculture, international action has been proposed and experimented with for many years. It is argued that by international commodity agreements the nations concerned can take the proper steps to secure greater stability of prices in the interest of producers as well as of consumers. The major trend of thought among the representatives of certain British producer-exporter groups seems to center around the idea of using large buffer stocks as equalizing reservoirs between years of short and large crops. Most of the experience with such commodity schemes has been discouraging, because they led almost invariably to the accumulation of most burdensome carry-overs, to the protection of the status quo of the existing production capacity, to production-curtailment policies, and to the frustration of competition and thereby of economic progress.

It has been argued that the world needs an "orderly" expansion of agriculture under the control of international commodity agreements. To this view I cannot subscribe. The world needs an expansion of its entire economy. This process inevitably involves a loss of capital, the taking of risk, the trial and venture. Why is it assumed that commodity-control boards precisely will exercise the wisdom of measuring how much expansion of their particular commodity the world economy needs?

Fortunately, one of the great powers is in the position of a heavy importer of food: Great Britain. She is vitally interested in obtaining food, one of her major industrial raw materials, at the best prices obtainable. The most promising and advanced model for international commodity agreements is the recent Anglo-American agreement on petroleum which is the forerunner of a world oil accord. It contains certain safeguards for the interests of the consumer and is built upon the conviction that the emphasis must be put on the development and full utilization of the resources and an equitable distribution of available supplies rather than on restriction of production and security of producers. Moreover, it relies on conference and co-operative analysis rather than on the establishment of rigid controls or quotas. Yet, even in the case of this agreement, it remains to be seen how far the wisdom of its administration will really extend and whether it will not drift into restrictive policies for the benefit of established producers. It is to be hoped that, if international arrangements on food commodities cannot be avoided, a similar type of agreement will evolve.

This is directly connected with the type of domestic farm policies to be chosen in many countries. If governments respond to the political pressures of farmers for greater security of income by fixing prices of farm products, the entire unsavory set of additional measures which thwart economic progress will inevitably follow. Production will be frozen on high-cost locations and in high-cost units. Once the automatism of universal adjustments which the flexible price mechanism enforces is upset, its functions must be performed by government decrees which, at best and under the most competent civil service, are, in comparison, clumsy and crude. Those who lose under such policies are, first of all, the consumers, but, secondly, the farmers as well, because they become civil servants on the receiving end.

The alternative is definitely not laissez faire but a determined public policy which grants a certain modest degree of income security by public underwriting without emancipating the price in the market from its all-important function of governing the adjustments in production, storage, utilization, and consumption. The British Wheat Act and its device of deficiency payments, which leaves the market alone but guarantees to the producers a minimum return on a certain production goal, deserves very careful study as the model of a policy which grants security without destroying competition or fettering the price automatism.

There is hardly another country in the world in which the official course of agricultural income and price policy is at present further out of line with the necessities of a sound adjustment to the future international conditions of the peace, and further out of line with the constructive consideration for the welfare of the rural community, than the United States. In view of a record crop of wheat and a record carry-over in the world's exporting countries, we boost the loan basis another 12 cents per bushel. At the same time we talk a great deal about how we can prevent the land boom from coming into full swing. We worry about export markets for American cotton, tobacco, lard, dry and condensed milk, and fruits in postwar years, but we guarantee export-prohibiting prices to the farmers until two years after the cessation of final hostilities. If no basic change occurs in this country and other agricultural exporting countries follow the lead of the United States, it may clearly be foreseen that during the new peace most of the importing countries will make more frantic efforts than ever before toward food autarchy. Domestic agricultural policy in the United States happens to be automatically an affair of major influence in international food policy, by virtue of its import and export position and its magnitude as a creditor country.

The elements of an international food policy are as follows: During the relief period the United Nations should enable those governments in need to obtain and distribute the food supplies required to protect their people in liberated and occupied areas against permanent injury to health from undernutrition and malnutrition. Such a policy may require temporary tightening of civilian rations for a few commodities in the United States. In order to shorten the relief period and to bring the agricultural and food economy in all countries back to normal as quickly as possible, the reconstruction of agriculture in the war zones should be supported by every means, particularly by shipping the necessary grain and oilseeds as feed materials for the reconstruction of the livestock herds.

For the longer run, the United Nations should put the strongest efforts into their Food and Agriculture Organization. The F.A.O. should become an enterprise for international intellectual co-operation on matters of food, nutrition, and agriculture, but not an action agency. It should be truly co-operative, free of any domination by any one of the big powers, and decentralized, with several regional headquarters outside their territory.

It is also to be hoped that each nation will dispatch the best brains, the most competent scholars and administrators to the F.A.O., and that this clearing house of knowledge, experience, and ideas about food and agriculture will inspire and guide the nations in their efforts to conquer hunger and deficiency diseases and to co-ordinate better the resources of the world's agriculture to the service of better nutrition. The F.A.O. can also act as a co-ordinating agency to muster and organize the co-operation of many other national and international agencies, fully aware of controversies of economic interest between nations. Its chief activity must, however, consist of research, consultation, information, and recommendation.

The establishment of the F.A.O. may well become one of the most promising events since the farsighted foundation of the International Institute of Agriculture by David Lubin and the King of Italy in 1905 and the formation of the League of Nations Mixed Committee on Nutrition in 1935. The proper functioning of the F.A.O. can be one of the important basic elements of an international food policy.

If functioning properly, the F.A.O. will do the nations' general staff work. The campaign itself against hunger and nutritional disease will be left to the execution of economic foreign and national policies which make possible the freest exchange of food. The wealthiest nations must open the road to an expanding world economy by lowering tariffs and removing the host of other protectionist measures, establishing a freer flow of long-term investment capital by restoring the security of foreign investments and by refraining from the use of deliberate currency depreciation as a means of competition in foreign trade. The countries with an undeveloped agrarian economy should be assisted in developing industries and improving the productivity of their farmers.

In all countries, particularly those engaged in agricultural export trade, governments should refrain from fixing prices of food in their domestic markets. In so far as they attempt to protect farmers against violent changes in income, it would be most advantageous for domestic as well as international food policies if such protection were granted in the form of a publicly guaranteed income floor. International food commodity arrangements should similarly refrain from international price-fixing and should seek protection against violent price fluctuation by a combination of other measures.

In conclusion, the writer believes emphatically that there never has been a greater opportunity in history to make progress toward the great goal of freedom from hunger and malnutrition for all than there will be at the end of this war. Whether progress will materialize or not depends partly on the quality of leadership and the sustained effort made by the community of nations. To an even greater extent, however, progress will depend on the degree of industrial and general economic prosperity which the nations of the world succeed in establishing by intelligent action in the coming peace. Poverty, long years of mass unemployment and depression, as well as economic nationalism, will defeat the most energetic food policy.

OBSERVATIONS OF PARTICIPANTS

Howard Tolley (United States Department of Agriculture): Do we, as economists or as citizens of the United States or as a few of the two billion in the world, feel that it is a fine thing for the world at large that we can have more food as time goes on?

Both papers gave me the impression that somehow or other it is too bad that we are going to have more food per capita in the world than we have had before; somehow or other it upsets the equilibrating mechanism of the economy. Dr. Brandt is apprehensive that this little start of international collaboration in food and agriculture will get out of hand and become an action agency. Is it a good thing or is it a bad thing to have more food?

Karl Brandt (Stanford University): Mr. Tolley has put a strange interpretation upon my reference to the F.A.O. I definitely want it, and expect it to be, in the coming decades one of the great institutions of the world. However, I have stressed the need of cautious policy because too many agencies of that nature are built upon great emotions. If the F.A.O. should founder in the backwash of a wave of enthusiasm, a truly great opportunity in international relations concerning food and agriculture would be lost.

It is certainly not a question of having the sort of action Dr. Tolley prefers, or no action, but to choose wisely among different alternatives of determined action. In this country we are given too much to hot waves of enthusiasm without following through. The F.A.O. can and will be one of the great international agencies, provided we use realistic common sense and refrain from being overzealous.

A. C. Bunce (Federal Reserve Board): One factor is of fundamental importance in the agricultural picture, namely, that agriculture historically has been competitive and that, in spite of the fact that it is competitive, it has had tremendous difficulty in adjusting, largely because of the fixed-cost nature of agriculture compared to industry.

Mr. Brandt wants to return essentially to a competitive price system in which the forces of supply and demand would be given more freedom than they have in the past, and he said nothing about the organic structure of the industrial world in which agriculture is situated. It would be a good idea and a desirable objective if, at the same time, we recognized that to achieve such an objective we shall have to have widespread reforms in industry. To do so we shall have to have our corporation law revised, the patent law changed, and break up the concentration of economic power which has occurred in most major industries. Just to go back to competition in agriculture will not solve the problem.

JOHN D. BLACK (Harvard University): Let me raise a question, not on policy, but on the statement about correlation between prices of farm products and migration. Would you disagree with the statement that, other things being the same, lower relative prices for farm products will tend to move more people out of agriculture?

THEODORE W. SCHULTZ (University of Chicago): Not if other things were equal to what we have had. If, however, we were to have ten years of expanding industrialization at a rate as rapid as we had in the two decades before the other war, at the end of the decade we would probably have the "expected" interaction between changes in farm prices and migration.

MR. BLACK: My belief is that lower farm prices would move people out of agriculture.

A. G. HART (Committee for Economic Development): A few words about the moral issues involved in doing something about the farmer. It seems to me it is overwhelmingly possible that we are going to have intervention and that most of us would say we ought to have intervention—which, with all qualifications for these nutritional objectives, is going to mean what we used to call "farm relief." Without such intervention we are certainly going to have a very painful period for a long time ahead for nearly all the agricultural groups.

There has been a tendency here to say that intervention simply reflects the political power of the farmer. Actually, it is obvious that it should not, and it is fairly obvious that it does not. This intervention would get nowhere if the nonagricultural community did not have a sense that somehow agricultural interests have a moral claim upon them which makes it necessary to accept adjustments which are to the immediate disadvantage of the nonagricultural community. That moral claim is, in fact as well as in principle, the foundation of the intervention. It is worth bringing to the surface the value judgments which we are making as to the character of that moral claim. Let me list, very briefly, a few spurious claims.

1. There is a notion, which in farm communities is very prominent,

that agriculture deserves support because food production is noble. This is related to the anthropologists' distinction between wealth and treasure: the farm groups, on the whole, feel that agricultural wealth is treasure, whereas other wealth is merely wealth.

2. In the agricultural community there is a nice rationalization to the effect that relieving the farmer is a way to lift the economy by its bootstraps; that somehow, if you put more income into the farmers' hands, the prosperity of the rest of the economy will be assured.

3. Another spurious claim rests on the assumption that there should be a taboo upon asking any influential group to accept a relative decline in its position. The farm parity standard is to a large extent that. Agriculture, as an organized group, has chosen that period at which its welfare relative to the rest of the community was at a maximum.

Now to turn to the valid side of the claims:

1. The farm community has a claim on the rest of the country as a place from which the new population comes. The maintenance of population and of the traits we put into population by education is a cost of maintaining social resources. It is a proper charge upon society in general, and it is very hard to see why it should be left to fall upon the particular people who happen to be the benefactors of society in that they generate the population and bring it up. Incidentally, gratitude on this score is very strong and clear-cut within nations, but the extent to which we are going to apply this aspect of a moral claim internationally is a thing we have to be most ashamed of when we bring it to the surface. Whereas we have a certain amount of use for the farmers in our own country as population producers, we certainly wish Rumanian farmers would not breed, and we do not aim to make any concessions if they do.

2. There are possibilities of very strong external economies within every society, for resources put into the agricultural economy for education and public health. Other sectors of the community stand to gain decidedly by additional inputs there—and inputs of a sort which the agricultural economy on its own account cannot afford.

3. We have also the fact that a lot of poverty is located on the farm. The existence of poverty on the farm does make some claim for a specific action.

4. Furthermore, the rest of the economy has insisted on functioning in ways which impose certain disabilities upon farmers as a

group. Maybe farmers have a claim for damages that cannot be completely ignored.

5. Finally, there is a danger of political and social infection of one sort or another, by having a widespread, important sector of the community which has a sense of being frustrated. Even though the farmer's sense of justice may not be valid in the light of philosophy, if the farmer feels that he is unjustly put upon, there is a political danger. In every field of social ethics we find ourselves obliged to make some concessions to the moral views of influential groups on the ground that a sense of injustice is an evil, however much we might debate the foundations of it.

If we analyze the character of these moral claims, we get something of a reorientation of programs of intervention. One would certainly hope to steer the intervention in a direction that has some relevance to the moral claim. In the nature of the case, price intervention can be justified only as a makeshift substitute for some other sort of intervention that has more relevance. A price, being even more inanimate than a corporation, cannot very well have justice or injustice inherent in it. The concept of a just price, when you analyze it, melts to an extraordinary degree into other problems.

There is a tremendous handicap to any sort of rational adaptation to these claims on account of the taboo in the farm community on unearned income, which results in the "principle" of getting everything through the market. The consequence is that a farmer feels very moral about accepting the additional income which he earns by making a smaller contribution to the national production and feels completely unwilling to accept the income which he earns by producing the workers and citizens of the next generation. If nothing can be done about this absurdity, we must assume that a large part of our intervention is going to go in directions which we cannot defend morally.

Now, plainly, this points in the direction of attempting to improve the so-called farm problem in large part by more generalized intervention. The fact that the next generation is being brought up on these conditions raises the question of whether we should not consider a generalized system of family allowances; whether we should not regard education and other aspects of the upbringing of children as more definitely social overhead charges rather than charges on the particular person who happens to be on the ground where it is going on. It raises questions about public health. It raises questions about making plain to the farm groups that the big thing they have a stake in is outside opportunity. That cannot be regarded as primarily a farm problem, but it can never be regarded as *not* a farm problem, which is the thing that somehow has not been conveyed.

R. E. BUCHANAN (Iowa State College): It seems to me that there are certain elements of probable significance to the future of agriculture which have been quite persistently ignored.

One tacit assumption is that the future of agriculture is tied entirely to food. There has been no discussion of future competition of agriculture as a source of supply of food, on the one hand, and as a source of supply of raw materials to be used for nonfood technology, on the other hand. An analysis of our petroleum situation, for example, would show that the calories produced per year on the farms in the United States would be in some reasonable relationship to the number of calories that are taken out of the oil wells in the United States in the course of a year. Another source of our raw material for technology is coal.

A large part of the total resources for our technology must perforce come from these three sources—farm products, petroleum, and coal. Now just what are the relative economic advantages of using any one of these in fields where two or more are in competition? We use these three types of resources for food and for energy and for manufacture of usable things both durable and consumable. Why is there not clearer realization of the substitutability of petroleum for coal and of agricultural products for petroleum and so on? Will our petroleum continue to expand—production of petroleum from the ground—in proportion to our need for it?

We have the technology in sight which would make quite possible and practical the complete substitution of petroleum by agricultural products or by coal. This is not to question the present economic advantage of petroleum for most of the uses for which it is now used, but I would emphatically challenge the assumption that two or three decades hence there will be the same relative economic advantage among these three groups of raw materials. In some of these matters our agricultural co-operatives are doing better thinking on the whole than our agricultural economists may be doing.

Advances in standards of living are largely, not exclusively, dependent upon these three groups of materials—farm products, petroleum, and coal—and upon their technological utilization. Convertibility of one resource to the uses historically ascribed to the other two basic groups is far greater now than in the past.

In an economic group such as we have here, why is this aspect of the problem ignored?

Will the volume of agricultural products going into nonfood uses increase sufficiently to make any marked differences to Dr. Schultz's analyses? I believe that the development of increased interconvertibility will make significant modifications in the postulates which he has laid down. We are all familiar with the fact that the replacement of one of the fundamental postulates of Euclid by another gives rise to a whole new geometry; it may be geometry which has certain practical uses, but the technologists and the engineers will still find classical Euclidean geometry most useful.

MR. SCHULTZ: At this point it may be better not to resolve each particular question but to save time for others to present their ideas.

WALTER W. WILCOX (University of Wisconsin): All the way through the discussion there has been stress on getting resources out of agriculture and at the same time about whether we can still use more resources in agriculture profitably. What we really mean is people out of agriculture. But getting people out of agriculture is not agricultural policy; it is industrial policy.

MR. BRANDT: Most of what Dr. Hart has said is fundamental and very significant. Yet the Good Society's criterion for all policies must remain how much freedom it can combine with the inevitable minimum of regimentation and controls. To shape policies is a game of finding the most intelligent compromise between the two, with proper emphasis on duties as well as rights. Our choice should lie in the direction of policies which do not block economic progress.

MR. BLACK: If Mr. Brandt had cast his analysis in terms of really realistic compromises, it would have been much more helpful.

MR. TOLLEY: If Mr. Brandt could define for me a little more what he meant when he said "free enterprise," it also would be helpful. The tone of the statement was that it is something good. Then if you could define for me what is meant by "government intervention," that also would be helpful. The tone of the paper was that it was something bad. Now, what do we mean when we use these tones?

MR. BRANDT: It is completely compatible with free enterprise that the government underwrite a certain part of private investors' risk in foreign investments. That is an unorthodox view for a liberal economist. If the government partially underwrites risk for foreign investment, it must necessarily have the right to veto specific investment. This gives it a lot of control, but it still does not transfer the investment business to a government agency.

In the case of in-plant feeding, "bad" intervention would have established a government agency which runs the in-plant feeding in all the war plants in the United States. We have not done that, but we have combined good intervention with free enterprise by discussing the desirable action with the industries, and government officials as consultants and free entrepreneurs as agents of action have accomplished most impressive progress in the in-plant feeding program of our country.

M. R. BENEDICT (University of California): Dr. Schultz spoke of the need for additional capital in agriculture, which is too large a subject for discussion here, but it seems to me that that is not an appropriate approach to the thing unless it can at the same time be accompanied by a large-scale movement of people out of agriculture. If we were to introduce into China and India much larger amounts of productive capital without other measures going with it, it would simply increase their difficulties.

MR. BLACK: It is highly desirable for economists to have long-run objectives in mind, such as those presented this morning. The principal reason that economists have been so little used and so little followed is that they have not been very competent in helping shape short-run policies. We must learn how to help people shape short-run policies that really accomplish necessary short-run objectives without doing violence to the long-run objectives. We have not done very well with this. If a congressman had been present at these meetings throughout—an earnest, sincere, well-intentioned congressman —who had had to go back to Washington to draft some legislation after the first of January in order to accomplish and achieve desirable ends, he would have felt he had not received much help.

SIMEON LELAND (University of Chicago): Someday some congressman will discover that good economics and good social policy are also good politics.

MR. SCHULTZ: I would have been disappointed if we all had agreed; I should also be disappointed if we did not focus the issues of our areas of disagreement so that they are clearer than they might have been before we met. I think that might be the real gain that has come as a residue.

Just a word on the number of the observations that have been made. For the most part they have been directed to Mr. Brandt because it was he who dealt with that seductive thing called policy while I stayed with the skeleton—the dead, dry bones which he tried to make walk!

On Mr. Wilcox's comment that getting capital into agriculture is a matter of people leaving agriculture, this is true. The fact that this might entail industrial policy is merely a recognition that industrialization is very relevant to the food and agricultural problem.

Two observations are in order on Dean Buchanan's comments. The first is that, obviously, food does not include all of agriculture. We have focused on food in international relations. Notwithstanding, throughout my analysis I used "farm products" instead of "food" in order to broaden it and to cover the very point made by Dean Buchanan.

Second, the available data indicate that the income elasticity for farm products, including fibers and raw materials, is very low. There is nothing in the experience of the interwar years to suggest that radical developments may occur soon. Past experience may not be a satisfactory guide as to what is likely to happen, yet the facts are that in the interwar period the technological progress affecting the demand for farm products derived from industrial uses shifted about as much demand away from agriculture as it shifted toward agriculture. In cotton there is the development of rayon. The advance in plastics has added to the demand for farm products. In the decline of the use of horses and mules there has been released upward of forty million acres—an area larger than the state of Iowa—by the development of tractors, automobiles, and trucks, with power derived from petroleum instead of from farm products fed to horses and mules.

There is no reason to suppose that in the next ten years the total impact of applied science in these spheres will change the cost structures of raw materials in favor of agriculture. May we not get a lot of material from wood that we now get from our fields and cultivated acres? There is nothing to indicate that in the near future our technology will develop processes that, on the one hand, will not lessen the industrial demand for farm products but, on the other, will sharply increase that demand.

With reference to the dissent voiced by Professor Black, it is not a question of whether there should be intervention or no intervention. Put thus, it is a false statement of the problem that confronts us in food and agriculture. The real issue is to ascertain the nature of the interventions that are required. In my analysis I did point to a very basic reconsideration of the purposes and effects of the particular interventions that have grown up in behalf of agriculture and food, especially in the last two decades. On the positive side, we should focus less upon price policy for the purpose of increasing the income of farmers and more upon price for the purpose of allocating resources. The next step is to reconsider the problem of income in terms of welfare claims.

To repeat, the choice is not in terms of intervention or no intervention, but in terms of determining upon the type of intervention which will better allocate resources, move products into consumption, and aid farmers on the income side.

Finally, most of what we have said with regard to improving the incomes of farmers has not taken account of the fact that perhaps half of the farm families in American agriculture are virtually outside the exchange economy. Here, again, it is necessary to reconsider in order to determine how to get incomes to the noncommercial farm families who carry so much of the population burden.

MR. BRANDT: It is necessary not only to consider long-run policy but to shape short-run measures. Whenever one participates in shaping short-run measures, the chief thing in choosing between alternatives is to have clearly in mind the larger, long-run policies. In discussions with people who shape policies in administration, the best contribution that could possibly be made to speed the process and to give them better guidance is to outline the basic philosophy of government. If that is not clear, the decisions taken in specific cases run immedately into controversies.

In choosing political compromises one always acts imperfectly in specific measures; and still the greatest need is to search for lines of policies which make it possible not to violate, by specific measures, by specific types of intervention, the larger values. That certainly is somewhat unsatisfactory to those who see the day-to-day jobs of shaping policies. It is, however, the best that can be done.

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